

EXHIBIT 40
[FILED UNDER SEAL]

HIGHLY CONFIDENTIAL

Page 1

1 UNITED STATES DISTRICT COURT

2 EASTERN DISTRICT OF TEXAS

3 SHERMAN DIVISION

4 -----x

5 THE STATE OF TEXAS, et al.,

6 Plaintiffs, Case No.

7 vs.

4:20-cv-00957-SDJ

8 GOOGLE, LLC,

9 Defendant.

10 -----x

11
12 ** HIGHLY CONFIDENTIAL **

13 VIDEOTAPED DEPOSITION OF CYNTHIA RUDIN

14 (Taken by Defendant)

15 Durham, North Carolina

16 Wednesday, October 9, 2024

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18
19
20
21 Reported by Andrea L. Kingsley, RPR

HIGHLY CONFIDENTIAL

<p style="text-align: right;">Page 2</p> <p>1 APPEARANCES</p> <p>2</p> <p>3 ON BEHALF OF PLAINTIFF STATE OF TEXAS:</p> <p>4 Marc B. Collier, Esquire</p> <p>5 Talbot Hansum, Esquire</p> <p>6 NORTON ROSE FULBRIGHT US LLP</p> <p>7 98 San Jacinto Boulevard</p> <p>8 Suite 1100</p> <p>9 Austin, Texas 78701-4255</p> <p>10 (512) 536-4549</p> <p>11 marc.collier@nortonrosefulbright.com</p> <p>12 talbot.hansum@nortonrosefulbright.com</p> <p>13 -and-</p> <p>14 Erik Janitens, Esquire (Via Zoom)</p> <p>15 NORTON ROSE FULBRIGHT US LLP</p> <p>16 1550 Lamar Street</p> <p>17 Suite 2000</p> <p>18 Houston, Texas 77010</p> <p>19 (713) 651-3629</p> <p>20 erik.janitens@nortonrosefulbright.com</p> <p>21</p> <p>22 -and-</p> <p>23</p> <p>24</p> <p>25</p> <p>26</p> <p>27</p> <p>28</p> <p>29</p> <p>30</p> <p>31</p> <p>32</p> <p>33</p> <p>34</p> <p>35</p> <p>36</p> <p>37</p> <p>38</p> <p>39</p> <p>40</p> <p>41</p> <p>42</p> <p>43</p> <p>44</p> <p>45</p> <p>46</p> <p>47</p> <p>48</p> <p>49</p> <p>50</p> <p>51</p> <p>52</p> <p>53</p> <p>54</p> <p>55</p> <p>56</p> <p>57</p> <p>58</p> <p>59</p> <p>60</p> <p>61</p> <p>62</p> <p>63</p> <p>64</p> 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<p>978</p> <p>979</p> <p>980</p> <p>981</p> <p>982</p> <p>983</p> <p>984</p> <p>985</p> <p>986</p> <p>987</p> <p>988</p> <p>989</p> <p>990</p> <p>991</p> <p>992</p> <p>993</p> <p>994</p> <p>995</p> <p>996</p> <p>997</p> <p>998</p> <p>999</p> <p>1000</p>	<p style="text-align: right;">Page 4</p> <p>1 VIDEOTAPED DEPOSITION OF CYNTHIA</p> <p>2 RUDIN, a witness called on behalf of the</p> <p>3 Plaintiff pursuant to the Federal Rules of</p> <p>4 Civil Procedure, before Andrea L. Kingsley,</p> <p>5 Notary Public in and for the State of North</p> <p>6 Carolina, at Veritext Legal Solutions, 811</p> <p>7 Ninth Street, Suite 260, Durham, North</p> <p>8 Carolina, on Wednesday, October 9, 2024,</p> <p>9 commencing at 9:11 a.m.</p> <p>10</p> <p>11</p> <p>12</p> <p>13</p> <p>14</p> <p>15</p> <p>16</p> <p>17</p> <p>18</p> <p>19</p> <p>20</p> <p>21</p> <p>22</p> <p>23</p> <p>24</p> <p>25</p>
<p style="text-align: right;">Page 3</p> <p>1 APPEARANCES (Continued):</p> <p>2</p> <p>3 ON BEHALF OF DEFENDANT, GOOGLE, INC.:</p> <p>4 James K. Hunsberger, Esquire</p> <p>5 Chandler R. Gordon, Esquire</p> <p>6 Sandhya Taneja, Esquire</p> <p>7 Maryanne Magnier, Esquire (Via Zoom)</p> <p>8 AXINN, VELTROP & HARKRIDER LLP</p> <p>9 1901 L Street NW</p> <p>10 Washington, DC 20036</p> <p>11 (202) 469-3561</p> <p>12 jhunsberger@axinn.com</p> <p>13 cgordon@axinn.com</p> <p>14 staneja@axinn.com</p> <p>15 mmagnier@axinn.com</p> <p>16</p> <p>17 -and-</p> <p>18</p> <p>19 Russell M. Steinthal, Esquire</p> <p>20 Andrew Freeborn, Esquire (Via Zoom)</p> <p>21 AXINN, VELTROP & HARKRIDER LLP</p> <p>22 114 West 47th Street</p> <p>23 New York, New York 10036</p> <p>24 (212) 728-2207</p> <p>25 rsteinthal@axinn.com</p> <p>26 afreeborn@axinn.com</p> <p>27</p> <p>28</p> <p>29</p> <p>30</p> <p>31</p> <p>32</p> <p>33</p> <p>34</p> <p>35</p> <p>36</p> <p>37</p> <p>38</p> <p>39</p> <p>40</p> <p>41</p> <p>42</p> <p>43</p> <p>44</p> <p>45</p> <p>46</p> <p>47</p> <p>48</p> <p>49</p> <p>50</p> <p>51</p> <p>52</p> <p>53</p> <p>54</p> <p>55</p> <p>56</p> <p>57</p> <p>58</p> <p>59</p> <p>60</p> <p>61</p> <p>62</p> <p>63</p> <p>64</p> <p>65</p> <p>66</p> <p>67</p> <p>68</p> <p>69</p> <p>70</p> <p>71</p> <p>72</p> <p>73</p> <p>74</p> <p>75</p> <p>76</p> <p>77</p> <p>78</p> <p>79</p> <p>80</p> <p>81</p> <p>82</p> <p>83</p> <p>84</p> <p>85</p> <p>86</p> <p>87</p> <p>88</p> <p>89</p> <p>90</p> <p>91</p> <p>92</p> <p>93</p> <p>94</p> <p>95</p> <p>96</p> <p>97</p> <p>98</p> <p>99</p> <p>100</p> <p>101</p> <p>102</p> <p>103</p> <p>104</p> <p>105</p> <p>106</p> <p>107</p> <p>108</p> <p>109</p> <p>110</p> <p>111</p> <p>112</p> <p>113</p> <p>114</p> <p>115</p> <p>116</p> <p>117</p> <p>118</p> <p>119</p> <p>120</p> <p>121</p> <p>122</p> <p>123</p> <p>124</p> <p>125</p> <p>126</p> <p>127</p> <p>128</p> <p>129</p> <p>130</p> <p>131</p> <p>132</p> <p>133</p> <p>134</p> <p>135</p> <p>136</p> <p>137</p> <p>138</p> <p>139</p> <p>140</p> <p>141</p> <p>142</p> <p>143</p> <p>144</p> <p>145</p> <p>146</p> <p>147</p> <p>148</p> <p>149</p> <p>150</p> <p>151</p> <p>152</p> <p>153</p> <p>154</p> <p>155</p> <p>156</p> <p>157</p> <p>158</p> <p>159</p> <p>160</p> <p>161</p> <p>162</p> <p>163</p> <p>164</p> <p>165</p> <p>166</p> <p>167</p> <p>168</p> <p>169</p> <p>170</p> <p>171</p> <p>172</p> <p>173</p> <p>174</p> <p>175</p> <p>176</p> <p>177</p> <p>178</p> <p>179</p> <p>180</p> <p>181</p> <p>182</p> <p>183</p> <p>184</p> <p>185</p> <p>186</p> <p>187</p> <p>188</p> <p>189</p> <p>190</p> <p>191</p> <p>192</p> <p>193</p> <p>194</p> <p>195</p> <p>196</p> <p>197</p> <p>198</p> <p>199</p> <p>200</p> <p>201</p> <p>202</p> <p>203</p> <p>204</p> <p>205</p> <p>206</p> <p>207</p> <p>208</p> <p>209</p> <p>210</p> <p>211</p> <p>212</p> <p>213</p> <p>214</p> <p>215</p> <p>216</p> <p>217</p> <p>218</p> <p>219</p> <p>220</p> <p>221</p> <p>222</p> <p>223</p> <p>224</p> <p>225</p> <p>226</p> <p>227</p> <p>228</p> <p>229</p> <p>230</p> <p>231</p> <p>232</p> <p>233</p> <p>234</p> <p>235</p> <p>236</p> <p>237</p> <p>238</p> <p>239</p> <p>240</p> <p>241</p> <p>242</p> <p>243</p> <p>244</p> <p>245</p> <p>246</p> <p>247</p> <p>248</p> <p>249</p> <p>250</p> <p>251</p> <p>252</p> <p>253</p> <p>254</p> <p>255</p> <p>256</p> <p>257</p> <p>258</p> <p>259</p> <p>260</p> <p>261</p> <p>262</p> <p>263</p> <p>264</p> <p>265</p> <p>266</p> <p>267</p> <p>268</p> <p>269</p> <p>270</p> <p>271</p> <p>272</p> <p>273</p> <p>274</p> <p>275</p> <p>276</p> <p>277</p> <p>278</p> <p>279</p> <p>280</p> <p>281</p> <p>282</p> <p>283</p> <p>284</p> <p>285</p> <p>286</p> <p>287</p> <p>288</p> <p>289</p> <p>290</p> <p>291</p> <p>292</p> <p>293</p> <p>294</p> <p>295</p>	

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<p style="text-align: right;">Page 6</p> <p>1 PROCEEDINGS</p> <p>2 THE VIDEOGRAPHER: We are now on</p> <p>3 record. Today's date is October 9, 2024, and</p> <p>4 the time 9:11 a.m.</p> <p>5 This is the video deposition of</p> <p>6 Cynthia Rudin.</p> <p>7 Will counsel please introduce</p> <p>8 yourselves, those in the room.</p> <p>9 MR. HUNSBERGER: James Hunsberger</p> <p>10 from Axinn, Veltrop & Harkrider for Google. I</p> <p>11 have my colleagues Russell Steinthal, Sandya</p> <p>12 Taneja and Chandler Gordon, also from Axinn,</p> <p>13 Veltrop & Harkrider for Google.</p> <p>14 MR. COLLIER: You want in the room</p> <p>15 first, then you will do Zoom?</p> <p>16 In the room you have Mark</p> <p>17 Collier and Talbot Hansum from Norton Rose</p> <p>18 Fulbright.</p> <p>19 Via Zoom from The Lanier Law Firm</p> <p>20 we have Zeke DeRose, Alex Abston, and Jonathan</p> <p>21 Jaffe.</p> <p>22 MR. HUNSBERGER: From Axinn,</p> <p>23 Veltrop & Harkrider also for Google we have</p> <p>24 Maryanne Magnier on Zoom.</p> <p>25 ---</p>	<p style="text-align: right;">Page 8</p> <p>1 Texas or Attorneys General that are bringing this</p> <p>2 case on behalf of several plaintiff states in this</p> <p>3 matter.</p> <p>4 Do you understand that?</p> <p>5 A. Yes.</p> <p>6 Q. When I refer generally to the</p> <p>7 "plaintiffs" today, I will be referring to the state</p> <p>8 plaintiffs in this matter.</p> <p>9 Do you understand that?</p> <p>10 A. Yes.</p> <p>11 Q. Do you understand that you are</p> <p>12 testifying today under oath?</p> <p>13 A. Yes.</p> <p>14 Q. Do you understand that you are required</p> <p>15 to tell the truth?</p> <p>16 A. Yes.</p> <p>17 Q. Is there anything that would prevent you</p> <p>18 from giving truthful answers to my questions today?</p> <p>19 A. No.</p> <p>20 Q. You're not experiencing any unusual</p> <p>21 stress or physical or mental condition?</p> <p>22 A. No.</p> <p>23 Q. And you're not on any medication or</p> <p>24 under the influence of any substances; correct?</p> <p>25 A. Correct.</p>
<p style="text-align: right;">Page 7</p> <p>1 CYNTHIA RUDIN, being duly sworn,</p> <p>2 was examined and testified as follows:</p> <p>3 EXAMINATION BY</p> <p>4 MR. HUNSBERGER:</p> <p>5 Q. Professor Rudin, nice to meet you</p> <p>6 earlier.</p> <p>7 Can you please state your name for the</p> <p>8 record.</p> <p>9 A. Cynthia Rudin.</p> <p>10 Q. Can you spell it for the court reporter,</p> <p>11 please.</p> <p>12 A. C-Y-N-T-H-I-A, R-U-D-I-N.</p> <p>13 Q. You are aware that you are being deposed</p> <p>14 in Texas, et al., v. Google, LLC, taking place in</p> <p>15 federal court in the Eastern District of Texas;</p> <p>16 correct?</p> <p>17 A. Yes.</p> <p>18 Q. When I say "this matter" or "this case"</p> <p>19 today I will be referring to the State of Texas</p> <p>20 v. Google matter in which you have submitted an</p> <p>21 expert report and are being deposed today.</p> <p>22 Do you understand that?</p> <p>23 A. Yes.</p> <p>24 Q. When I say "Texas" or "Attorneys</p> <p>25 General" today, I will be referring to the State of</p>	<p style="text-align: right;">Page 9</p> <p>1 Q. The court reporter here will transcribe</p> <p>2 everything we say and, as we discussed before we</p> <p>3 went on the record, a lot of complex technical</p> <p>4 subject matter that we will covering today, so it's</p> <p>5 very important that we try to talk slowly. It's</p> <p>6 important that we wait for each other to finish</p> <p>7 asking or answering a question before the other</p> <p>8 begins talking.</p> <p>9 Do you understand?</p> <p>10 A. Yes.</p> <p>11 Q. Because we have a court reporter here</p> <p>12 transcribing what we say, it's important to give</p> <p>13 oral responses to my questions, so please try to</p> <p>14 avoid head nods or "uh-huhs."</p> <p>15 Do you understand?</p> <p>16 A. Yes.</p> <p>17 Q. If you don't understand a question that</p> <p>18 I ask, please feel free to ask me to rephrase it or</p> <p>19 repeat the question.</p> <p>20 Does that make sense?</p> <p>21 A. Yes.</p> <p>22 Q. If you answer my question, I'm going to</p> <p>23 assume you understood it.</p> <p>24 Does that make sense?</p> <p>25 A. Yes.</p>

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<p style="text-align: right;">Page 10</p> <p>1 Q. If you need a break, please let me know 2 and I will try to find a good stopping point in my 3 questions. I will just ask that you please answer 4 the question that is pending before we take a break. 5 Does that sound good? 6 A. Yes. 7 MR. COLLIER: Mr. Hunsberger, 8 before we go on, minor thing. I may from time 9 to time have to stand. I had spinal surgery, 10 and I have so stand. But I will keep the 11 microphone on. I'm not asking to stop. But 12 if I stand, that's all that is is the doctor; 13 I have to stand every hour. 14 MR. HUNSBERGER: I understand, 15 Counselor. 16 MR. COLLIER: Same to you. If I 17 stand, it's not to do with you. It's doctor's 18 orders. Old-man back. 19 BY MR. HUNSBERGER: 20 Q. Professor Rudin, I'm handing you what 21 has been marked for the record Rudin Exhibit 1. 22 (Rudin Exhibit 1, Expert Rebuttal 23 Report of Cynthia Rudin, 09-09-2024, marked 24 for identification, as of this date.) 25 BY MR. HUNSBERGER:</p>	<p style="text-align: right;">Page 12</p> <p>1 Q. You are offering rebuttal opinions only 2 in response to certain opinions from Google's 3 experts; namely, Professor Milgrom, Professor 4 Wiggins and Professor Ghose; correct? 5 A. No. 6 Q. Which other plaintiffs' experts are you 7 rebutting? 8 A. So I'm responding to Milgrom, Wiggins, 9 Ghose and Baye. 10 Q. Other than those four experts, you are 11 not offering any other rebuttal opinions; correct? 12 A. My assignment was to rebut those 13 reports. 14 Q. And you do not intend to offer any 15 affirmative opinions in this case; correct? 16 MR. COLLIER: Objection. Vague. 17 A. What is an affirmative opinion? 18 Q. In other words, you do not intend to 19 offer any opinions during plaintiffs' case-in-chief? 20 A. I'm sorry. I don't understand the 21 question. 22 MR. COLLIER: Counsel, I might be 23 able to help you move along. "Case-in-chief," 24 that's a legal term. I will stipulate she's 25 here as a rebuttal expert witness, if that</p>
<p style="text-align: right;">Page 11</p> <p>1 Q. This is a copy of the rebuttal report 2 you served in this matter on September 9, 2024; 3 correct? 4 A. Correct. 5 Q. Please keep this by you for reference 6 throughout our conversation today. We will be 7 referring back to it a number of times. 8 This report represents your opinions in 9 this matter; correct? 10 A. Correct. 11 Q. You did not serve an errata for your 12 report; correct? 13 A. Correct. 14 Q. Sitting here today, is there anything in 15 your report that you do not believe is correct or 16 that you would not be willing to testify to under 17 oath? 18 A. No. 19 Q. You are not offering any opinions in 20 this case other than those described in your 21 rebuttal report; correct? 22 A. Correct. 23 Q. You are only offering rebuttal opinions 24 in this case; is that correct? 25 A. Correct.</p>	<p style="text-align: right;">Page 13</p> <p>1 helps you. 2 BY MR. HUNSBERGER: 3 Q. My question is whether you're offering 4 any affirmative opinions as part of plaintiffs' main 5 case in this case matter. 6 A. I'm sorry -- 7 MR. COLLIER: I will object to 8 form. 9 A. I don't understand the terminology. 10 MR. HUNSBERGER: Counsel, we'll 11 move on on the basis of your representation 12 she's only serving as a rebuttal witness in 13 this matter. 14 MR. COLLIER: That is my 15 representation, Counsel. Your phrase 16 "affirmative opinions," even I am confused as 17 to what you are trying to say. She has 18 affirmative opinions. 19 BY MR. HUNSBERGER: 20 Q. Are you offering any opinions in this 21 matter that are not responsive to one of the four 22 Google experts that we just discussed? 23 MR. COLLIER: Objection to the 24 form. 25 Go ahead.</p>

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<p style="text-align: right;">Page 14</p> <p>1 A. My opinions are in this report.</p> <p>2 Q. And your opinions are limited only to</p> <p>3 opinions that respond to Professors Milgrom, Ghose,</p> <p>4 Baye and Wiggins; correct?</p> <p>5 MR. COLLIER: Objection to the</p> <p>6 form.</p> <p>7 You can answer.</p> <p>8 A. The opinions are in this report.</p> <p>9 Q. I'm asking you to confirm whether the</p> <p>10 opinions you are providing are limited only to</p> <p>11 opinions that respond to those four plaintiffs'</p> <p>12 experts.</p> <p>13 MR. COLLIER: Objection to the</p> <p>14 form. Asked and answered.</p> <p>15 Go ahead.</p> <p>16 A. The opinions in this report do respond</p> <p>17 to those reports. There may be things in here</p> <p>18 that, you know, respond to various Google exhibits</p> <p>19 or so on, but the opinions are in the report.</p> <p>20 Q. The only opinions that you are offering</p> <p>21 in this case are those described in your report;</p> <p>22 correct?</p> <p>23 A. Correct.</p> <p>24 Q. At a high level, you were asked to</p> <p>25 evaluate certain opinions discussed in the expert</p>	<p style="text-align: right;">Page 16</p> <p>1 matter as an economics expert; correct?</p> <p>2 A. Correct.</p> <p>3 Q. You are not offering opinions in this</p> <p>4 matter as an expert in advertising technology;</p> <p>5 correct?</p> <p>6 MR. COLLIER: Objection to the</p> <p>7 form.</p> <p>8 A. I'm an expert in machine learning, which</p> <p>9 is relevant to advertising technology.</p> <p>10 Q. It's relevant to advertising technology,</p> <p>11 but you do not claim expertise in advertising</p> <p>12 technology; correct?</p> <p>13 MR. COLLIER: Objection to the</p> <p>14 form.</p> <p>15 You can answer.</p> <p>16 A. I'm an expert in machine learning, which</p> <p>17 is relevant to advertising technology.</p> <p>18 Q. If we look at paragraph 7 of your</p> <p>19 report, Exhibit 1, you state here that, "My core</p> <p>20 expertise is in machine learning, statistics,</p> <p>21 optimization and data science.</p> <p>22 Do you see that?</p> <p>23 A. Yes.</p> <p>24 Q. You do not list that you have expertise</p> <p>25 in display advertising technology; correct?</p>
<p style="text-align: right;">Page 15</p> <p>1 reports submitted on behalf of Google; correct?</p> <p>2 A. Correct.</p> <p>3 Q. And your opinion is based on your</p> <p>4 expertise in machine learning?</p> <p>5 MR. COLLIER: Objection to the</p> <p>6 form.</p> <p>7 A. Machine learning, statistics, data</p> <p>8 mining, yes.</p> <p>9 Q. You do not offer opinions in this matter</p> <p>10 in any other expert capacity; correct?</p> <p>11 MR. COLLIER: Objection to the</p> <p>12 form.</p> <p>13 A. Can you expand on that question?</p> <p>14 Q. You testified that you are offering</p> <p>15 opinions as an expert in machine learning,</p> <p>16 statistics and data mining; is that correct?</p> <p>17 A. That's correct.</p> <p>18 Q. Are you offering expert opinions in any</p> <p>19 other discipline?</p> <p>20 A. I mean, my expertise covers a pretty</p> <p>21 decent range of fields, so I don't want to limit</p> <p>22 myself to, you know, just these things. I'm very</p> <p>23 good at optimization, for instance, and so on. I</p> <p>24 think my opinions cover my range of expertise.</p> <p>25 Q. You are not offering opinions in this</p>	<p style="text-align: right;">Page 17</p> <p>1 A. In this paragraph I do not list that I'm</p> <p>2 an expert in display advertising. My expertise is</p> <p>3 relevant to display advertising.</p> <p>4 Q. But you do not claim to be an expert in</p> <p>5 advertising technology; correct?</p> <p>6 MR. COLLIER: Objection to the</p> <p>7 form.</p> <p>8 Go ahead.</p> <p>9 A. Machine learning is relevant to</p> <p>10 advertising technology as well as statistics,</p> <p>11 optimization and data science.</p> <p>12 Q. But you have never worked in the</p> <p>13 advertising technology industry; correct?</p> <p>14 A. I'm not sure what you mean by "worked in</p> <p>15 advertising technology." I certainly worked with</p> <p>16 data that's relevant to advertising technology,</p> <p>17 so...</p> <p>18 Q. Have you ever worked for a company that</p> <p>19 provides advertising technology products?</p> <p>20 A. Have I ever worked for a company that --</p> <p>21 I don't believe I've worked for a company that</p> <p>22 provides advertising technology.</p> <p>23 Q. You have a graduate degree in applied</p> <p>24 and computational mathematics; is that correct?</p> <p>25 A. Yes.</p>

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<p style="text-align: right;">Page 18</p> <p>1 Q. Did you have any particular 2 specialization when you worked on that degree? 3 A. My specialization in graduate school is 4 machine learning. 5 Q. As we've discussed, you consider 6 yourself an expert in machine learning? 7 A. Yes. 8 Q. On what basis do you consider yourself 9 an expert in machine learning? 10 MR. COLLIER: Objection to the 11 form. 12 A. My expertise is based on my 20-some 13 years of experience, numerous awards, numerous 14 keynotes at top conferences, numerous papers and 15 top machine-learning venues, all with the other 16 things listed in my CV. 17 Q. Are you an expert in antitrust 18 economics? 19 A. No. 20 Q. Are you an expert on antitrust law? 21 A. No. 22 Q. Are you an expert in auction theory? 23 A. I'm not an expert in auction theory. 24 Q. Do you have any academic degrees in any 25 other fields besides computer science and applied</p>	<p style="text-align: right;">Page 20</p> <p>1 Computational Learning Systems from 2007 to 2009; 2 correct? 3 A. Correct. 4 Q. And you were an assistant professor of 5 statistics at Massachusetts Institute of Technology 6 from 2009 to 2013; correct? 7 A. Correct. 8 Q. You were then an associate professor of 9 statistics also at MIT from 2013 to 2016? 10 A. Correct. 11 Q. And you were an associate professor at 12 Duke University from 2016 to 2019; correct? 13 A. Correct. 14 Q. Going back to your areas of expertise, 15 have you published any peer-reviewed work in 16 antitrust law? 17 A. No. 18 Q. Have you published any peer-reviewed 19 work in antitrust economics? 20 A. No. 21 Q. Have you published any peer-reviewed 22 work in auction theory? 23 A. No. 24 Q. Have you published any peer-reviewed 25 work in market design?</p>
<p style="text-align: right;">Page 19</p> <p>1 mathematics? 2 A. Yes. 3 Q. What are your other degrees? 4 A. I have academic degrees in mathematical 5 physics, music theory, applied computational 6 mathematics. 7 Q. Are you an expert in the field of market 8 design? 9 A. Not an expert in market design. 10 (Rudin Exhibit 2, Curriculum vitae, 11 marked for identification, as of this date.) 12 BY MR. HUNSBERGER: 13 Q. I'm going to hand you another exhibit. 14 This exhibit has been marked as Rudin Exhibit 2. I 15 represent to you this is the CV attached to your 16 rebuttal report. 17 If we look at page 2, which is -- it is 18 labeled page 2 on the front, but it's the very first 19 page. Under "Employment History" it lists that you 20 are a National Science Foundation, or NSF, 21 Postdoctoral Research Fellow at New York University 22 from 2004 to 2007; correct? 23 A. Correct. 24 Q. You were an associate research scientist 25 at Columbia University in their Center for</p>	<p style="text-align: right;">Page 21</p> <p>1 A. No. 2 Q. In your tenure as an academic have you 3 taught any courses on display advertising 4 technology? 5 A. I've taught courses that are relevant to 6 display advertising. 7 Q. What courses were those? 8 A. Machine learning and statistics. 9 Q. What was the extent of your coverage of 10 display advertising technology in those courses? 11 A. I covered machine learning and 12 statistics that are relevant skills for people who 13 want to work in display advertising. I may have 14 used datasets from advertising as part of the 15 homework assignments for my courses. 16 Q. You may have used datasets or you did 17 use datasets? 18 A. Well, a lot of my homework problems use 19 datasets, and sometimes students get to choose 20 their datasets and sometimes we assign datasets. 21 But there are some datasets that are relevant to 22 display advertising that students would have used 23 in their homework assignments. 24 Q. Were any of your classes for those 25 courses specifically focused on display advertising</p>

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<p style="text-align: right;">Page 22</p> <p>1 technology?</p> <p>2 A. My classes were relevant to the</p> <p>3 technology used in display advertising.</p> <p>4 Q. Did you specifically discuss during</p> <p>5 those classes display advertising technology?</p> <p>6 A. I discussed in those classes topics</p> <p>7 relevant to display advertising.</p> <p>8 Q. But you did not discuss display</p> <p>9 advertising technology specifically; correct?</p> <p>10 MR. COLLIER: Objection to the</p> <p>11 form.</p> <p>12 You can answer.</p> <p>13 A. I'm not sure exactly what you mean, in</p> <p>14 the sense that I have already answered that the</p> <p>15 tools that I provide -- that I teach students are</p> <p>16 relevant to display advertising.</p> <p>17 Q. If I understand correctly, you're saying</p> <p>18 the tools you teach in those courses can be applied</p> <p>19 to the display advertising technology industry; is</p> <p>20 that correct?</p> <p>21 A. That's correct.</p> <p>22 Q. But you did not specifically discuss</p> <p>23 display advertising technology in the context of</p> <p>24 those courses; correct?</p> <p>25 A. As I mentioned, we have datasets that</p>	<p style="text-align: right;">Page 24</p> <p>1 same?</p> <p>2 A. My answer would probably be similar,</p> <p>3 yes.</p> <p>4 Q. Have you taught any courses about</p> <p>5 antitrust during the course of your academic tenure?</p> <p>6 A. No.</p> <p>7 Q. Have you taught any courses about</p> <p>8 economics in the course of your academic tenure?</p> <p>9 A. Some of the work that I -- some of the</p> <p>10 things I do overlap with economics.</p> <p>11 Q. In what way?</p> <p>12 A. Well, a lot of my work involves</p> <p>13 observational causal inference, and I mention that</p> <p>14 every year.</p> <p>15 Q. Have you taught any courses about</p> <p>16 auction theory?</p> <p>17 A. No.</p> <p>18 Q. Before completing the report in this</p> <p>19 case, have you applied machine learning to the</p> <p>20 display advertising technology industry?</p> <p>21 MR. COLLIER: Objection to the</p> <p>22 form.</p> <p>23 A. I've created -- I've even helped create</p> <p>24 datasets involved in advertising, so -- sorry. Can</p> <p>25 you be more specific?</p>
<p style="text-align: right;">Page 23</p> <p>1 are based on display advertising, so I may have</p> <p>2 said things relevant to or trying to predict X --</p> <p>3 or Y from X, and those X and those Y come from</p> <p>4 display advertising.</p> <p>5 Q. What percentage of those courses do you</p> <p>6 think you were talking about datasets from the</p> <p>7 display advertising technology industry?</p> <p>8 A. I'm not sure. I'm not sure. I mean, it</p> <p>9 could be that students chose to do -- we have</p> <p>10 projects in my classes, and students may have</p> <p>11 chosen to use display advertising datasets. I</p> <p>12 teach hundreds of students, so it might be that</p> <p>13 every year a student chose to do a project with a</p> <p>14 display advertising dataset; I'm not sure.</p> <p>15 Q. How many students out of the hundreds</p> <p>16 that you have taught use datasets from display</p> <p>17 advertising technology, in your estimation?</p> <p>18 A. I don't know because I don't grade the</p> <p>19 assignments.</p> <p>20 Q. Do you have an approximate estimate?</p> <p>21 A. Nope.</p> <p>22 Q. If I ask you if these courses involved</p> <p>23 any other industry other than display advertising</p> <p>24 technology in which machine learning might be</p> <p>25 relevant, would your answer be substantially the</p>	<p style="text-align: right;">Page 25</p> <p>1 Q. Have you ever used machine learning --</p> <p>2 your machine-learning expertise in the display</p> <p>3 advertising technology industry before this case?</p> <p>4 A. I've used and developed datasets that</p> <p>5 involved advertising. I have not worked in -- you</p> <p>6 know, for a -- for a technology -- company that</p> <p>7 does display advertising.</p> <p>8 Q. What were those datasets that involved</p> <p>9 advertising?</p> <p>10 A. Well, there are probably multiple</p> <p>11 datasets we've used that involve advertising. The</p> <p>12 one that I developed was a survey, and it involved</p> <p>13 recommendations when you're driving your vehicle</p> <p>14 for a coffee shop or restaurant or something like</p> <p>15 that.</p> <p>16 Q. In what context did you prepare that</p> <p>17 report? Was it prepared as part of your academic</p> <p>18 work or on behalf of a company?</p> <p>19 A. So that work was funded by a company,</p> <p>20 but it was purely academic work. And it was</p> <p>21 published.</p> <p>22 Q. Which company funded that work?</p> <p>23 A. Ford.</p> <p>24 Q. Professor Rudin, moving on from your</p> <p>25 background to any areas in which you testified or</p>

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<p style="text-align: right;">Page 26</p> <p>1 have done expert work before, I would just like to</p> <p>2 understand some of your background in the litigation</p> <p>3 context.</p> <p>4 Have you ever been deposed before?</p> <p>5 A. Yes.</p> <p>6 Q. In what case were you deposed?</p> <p>7 MR. COLLIER: I don't know what</p> <p>8 this case is. You can tell him the case, but</p> <p>9 if there's a protective order that governs</p> <p>10 that case, I'm going to instruct you to follow</p> <p>11 whatever the court's order is and not disclose</p> <p>12 details.</p> <p>13 I think Mr. Hunsberger will tell</p> <p>14 you he's not asking for anything confidential.</p> <p>15 He is asking for a general description. But I</p> <p>16 want you to follow all court orders about</p> <p>17 describing that testimony.</p> <p>18 BY MR. HUNSBERGER:</p> <p>19 Q. Correct. I'm not asking you to share</p> <p>20 any information that's subject to protective order.</p> <p>21 If I ask a question and there is information that</p> <p>22 would be responsive to my question but you're not</p> <p>23 going to disclose because of a protective, just say</p> <p>24 that for the record so we're clear.</p> <p>25 So in what case were you previously</p>	<p style="text-align: right;">Page 28</p> <p>1 Q. Did that case, Flores v. Stanford, did</p> <p>2 that case involve display advertising technology?</p> <p>3 A. No.</p> <p>4 Q. Have you ever served as a consulting</p> <p>5 expert before?</p> <p>6 MR. COLLIER: I will let you answer</p> <p>7 that question. You can say yes or no.</p> <p>8 Counsel, I'm sure you're not trying</p> <p>9 to invade any expert consulting privileges,</p> <p>10 but I'm not going to allow you to do it.</p> <p>11 You can answer yes or no if you</p> <p>12 have ever been a consultant.</p> <p>13 A. I've been a consultant before.</p> <p>14 MR. HUNSBERGER: Counsel, your</p> <p>15 position is that you're claiming -- plaintiff</p> <p>16 states are claiming privilege over prior</p> <p>17 consulting work that she may have done for</p> <p>18 other clients; is that your position?</p> <p>19 MR. COLLIER: You can ask about</p> <p>20 other clients to the extent it doesn't cause</p> <p>21 her to violate any protective orders or</p> <p>22 anything.</p> <p>23 But what you cannot do is invade</p> <p>24 any consulting expert privilege held by any of</p> <p>25 the states in this matter. So if you want to</p>
<p style="text-align: right;">Page 27</p> <p>1 deposed?</p> <p>2 A. Stanford v. Flores.</p> <p>3 Q. Again, without disclosing any</p> <p>4 information that's subject to a protective order,</p> <p>5 what was your assignment in that case?</p> <p>6 MR. COLLIER: I will just caution</p> <p>7 you to be general, given I'm sure there's a</p> <p>8 protective order.</p> <p>9 A. That case involved criminal justice.</p> <p>10 Q. Which party were you deposed on behalf</p> <p>11 of?</p> <p>12 A. I probably should stop here, because I</p> <p>13 don't know what's covered under the protective</p> <p>14 order.</p> <p>15 Q. Did you testify at trial in that case?</p> <p>16 A. That case never went to trial.</p> <p>17 Q. Have you ever testified at a trial in</p> <p>18 any other case?</p> <p>19 A. No.</p> <p>20 Q. Have you ever offered a written</p> <p>21 declaration in any other legal proceeding?</p> <p>22 A. No.</p> <p>23 Q. Have you ever prepared an expert report</p> <p>24 in any other legal proceeding?</p> <p>25 A. Just the one mentioned above.</p>	<p style="text-align: right;">Page 29</p> <p>1 carve that out of your question, that's fine.</p> <p>2 I'm not -- if she's consulted with</p> <p>3 Ford, generally speaking you can ask about</p> <p>4 that. But you're not going to ask if she's</p> <p>5 been a consultant for Norton Rose Fulbright or</p> <p>6 the State of Texas or any of that unless and</p> <p>7 until she has issued a report or become a</p> <p>8 testifying expert. Or can you ask her about</p> <p>9 it. I will instruct her not to answer.</p> <p>10 MR. HUNSBERGER: Just to be clear,</p> <p>11 Counsel, your position is that if Professor</p> <p>12 Rudin has consulted the -- any of the</p> <p>13 plaintiff states in any other prior matter,</p> <p>14 you are claiming privilege on behalf of any of</p> <p>15 those plaintiff states?</p> <p>16 MR. COLLIER: Correct. When you</p> <p>17 say "prior matter," particularly including any</p> <p>18 ongoing matters.</p> <p>19 BY MR. HUNSBERGER:</p> <p>20 Q. Other than any work on behalf of any of</p> <p>21 the plaintiff states in this matter, have you ever</p> <p>22 served as a consulting expert in any other matter?</p> <p>23 MR. COLLIER: Dr. Rudin, here he's</p> <p>24 saying consulting expert as opposed to a</p> <p>25 consultant, as if you were hired by Ford on a</p>

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<p style="text-align: right;">Page 30</p> <p>1 business thing.</p> <p>2 So based on his question about</p> <p>3 consulting expert, I instruct you not to waive</p> <p>4 any consulting privileges for Texas, any other</p> <p>5 states, or, frankly, any other matter you have</p> <p>6 been engaged as a consulting expert but have</p> <p>7 not submitted an expert report, I will say</p> <p>8 yet.</p> <p>9 That said, you can answer freely</p> <p>10 about Ford or any other consulting work you've</p> <p>11 done generally.</p> <p>12 With that said, you are free to</p> <p>13 answer. If you need me to repeat the</p> <p>14 instructions.</p> <p>15 MR. HUNSBERGER: Counsel, I feel</p> <p>16 like you're putting words in the witness's</p> <p>17 mouth, which I don't --</p> <p>18 MR. COLLIER: No. I'm giving --</p> <p>19 MR. HUNSBERGER: -- I object to.</p> <p>20 You can give an instruction, but it</p> <p>21 was a pretty long instruction, so I'm just</p> <p>22 going to object to that.</p> <p>23 MR. COLLIER: You can object all</p> <p>24 you want. And I will repeat the instruction</p> <p>25 if I need to, Counsel.</p>	<p style="text-align: right;">Page 32</p> <p>1 MR. COLLIER: You're going to get</p> <p>2 the same instruction. So ask again.</p> <p>3 BY MR. HUNSBERGER:</p> <p>4 Q. Other than --</p> <p>5 MR. COLLIER: By the way, I caution</p> <p>6 you, Counsel, you are asking direct questions</p> <p>7 about consulting expert work. So I want you</p> <p>8 to think before you start keep asking her to</p> <p>9 violate -- because this is your ethical</p> <p>10 obligation.</p> <p>11 Ask your question.</p> <p>12 I will instruct you. Don't answer</p> <p>13 until I either object or let you</p> <p>14 answer depending on how he phrases the</p> <p>15 question.</p> <p>16 MR. HUNSBERGER: Counsel, to be</p> <p>17 clear, I'm not asking the witness to violate a</p> <p>18 protective order. I'm not asking the witness</p> <p>19 to violate any confidentiality agreements</p> <p>20 she's subject to. I'm not trying to invade</p> <p>21 any of the plaintiff states' privileges, and</p> <p>22 I'm not trying to invade any other legitimate</p> <p>23 privileges. I want to be very clear on that</p> <p>24 on the record.</p> <p>25 BY MR. HUNSBERGER:</p>
<p style="text-align: right;">Page 31</p> <p>1 You're not going to waive --</p> <p>2 MR. HUNSBERGER: I'm not asking her</p> <p>3 to --</p> <p>4 MR. COLLIER: Mr. Hunsberger --</p> <p>5 MR. HUNSBERGER: My question was</p> <p>6 other than any work on behalf of any of the</p> <p>7 plaintiff states in this matter, have you ever</p> <p>8 served as a consulting expert in any other</p> <p>9 matter.</p> <p>10 MR. COLLIER: Counsel, I am warning</p> <p>11 you, if she has been engaged by -- I will say</p> <p>12 IBM on an ongoing matter and as their</p> <p>13 consultant, you're not allowed to waive IBM's</p> <p>14 consulting privilege.</p> <p>15 MR. HUNSBERGER: And you're not</p> <p>16 entitled to object on IBM's behalf.</p> <p>17 MR. COLLIER: I'm representing the</p> <p>18 witness. I'm entitled to keep you from having</p> <p>19 her violate a court order or a protective</p> <p>20 order.</p> <p>21 MR. HUNSBERGER: I have made clear</p> <p>22 I am not asking her to violate a protective</p> <p>23 order. I've made clear I'm not asking her to</p> <p>24 violate any privileges.</p> <p>25 Let me ask the question again.</p>	<p style="text-align: right;">Page 33</p> <p>1 Q. Other than any work on behalf of the</p> <p>2 plaintiff states in this matter or the plaintiff</p> <p>3 states in any other matter, and without revealing</p> <p>4 any information that's subject to a protective</p> <p>5 order, and without waiving any privileges, have you</p> <p>6 served as a consulting expert in any other matter?</p> <p>7 A. So I actually can't answer that question</p> <p>8 because some of the work that I do is under</p> <p>9 protective order. So I can't violate the</p> <p>10 protective order. And so I can't reveal that</p> <p>11 information. If I could reveal it, it would be on</p> <p>12 my CV.</p> <p>13 Q. Understood.</p> <p>14 MR. HUNSBERGER: Counsel, that's</p> <p>15 all I was trying to ask.</p> <p>16 MR. COLLIER: You understand I</p> <p>17 didn't object. That was a fair question.</p> <p>18 MR. HUNSBERGER: We don't need to</p> <p>19 fight over this.</p> <p>20 BY MR. HUNSBERGER:</p> <p>21 Q. Again, with the same carveouts, so other</p> <p>22 than any work on behalf plaintiff states in this</p> <p>23 matter or plaintiff states in any other matter, and</p> <p>24 without revealing any information that's subject to</p> <p>25 a protective order, and without waiving any</p>

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<p style="text-align: right;">Page 34</p> <p>1 privileges, did any of your prior work involve the</p> <p>2 display advertising technology industry?</p> <p>3 A. That's a complicated question. If I</p> <p>4 understood the question correctly, I believe the</p> <p>5 answer is no.</p> <p>6 Q. Moving on to this case.</p> <p>7 Who retained you in this case?</p> <p>8 A. I was retained by Keystone and the State</p> <p>9 of Texas.</p> <p>10 Q. Keystone is a consulting firm; is that</p> <p>11 correct?</p> <p>12 A. That's correct.</p> <p>13 Q. Without revealing the matter or without</p> <p>14 revealing any privileged information if you're able,</p> <p>15 have you ever been retained by any of the plaintiff</p> <p>16 states in any other matter?</p> <p>17 A. I'm sorry, I cannot reveal that</p> <p>18 information.</p> <p>19 Q. A simple yes-or-no answer?</p> <p>20 MR. COLLIER: I'm going to object</p> <p>21 to form.</p> <p>22 MR. HUNSBERGER: I can try again.</p> <p>23 MR. COLLIER: I think she can give</p> <p>24 you the answer you're looking for, but --</p> <p>25 MR. HUNSBERGER: Let me start from</p>	<p style="text-align: right;">Page 36</p> <p>1 this case?</p> <p>2 A. I signed the protective order on</p> <p>3 July 15, 2021.</p> <p>4 Q. When did you first start working on the</p> <p>5 report that you produced on September 9, 2024 in</p> <p>6 this matter?</p> <p>7 MR. COLLIER: Objection to the</p> <p>8 form.</p> <p>9 A. I started working on this report when I</p> <p>10 received the assignment to produce a rebuttal of --</p> <p>11 when I received the documents from -- the expert</p> <p>12 reports from Google and was assigned to create a</p> <p>13 rebuttal.</p> <p>14 Q. Did you do any work on this matter</p> <p>15 between July of 2021 and -- when you were retained</p> <p>16 and when you received plaintiffs' expert -- Google's</p> <p>17 experts' reports that you would be rebutting?</p> <p>18 A. Yes.</p> <p>19 Q. When did you start doing that work?</p> <p>20 A. I'm not sure.</p> <p>21 Q. Was it in 2021? 2022? Just the</p> <p>22 approximate year.</p> <p>23 A. 2021.</p> <p>24 Q. On page 5 of your report, paragraph 3,</p> <p>25 you state that you are compensated for your work on</p>
<p style="text-align: right;">Page 35</p> <p>1 the top.</p> <p>2 BY MR. HUNSBERGER:</p> <p>3 Q. I'm looking for a yes-or-no answer.</p> <p>4 Without revealing the matter, without</p> <p>5 revealing any privileged information, without</p> <p>6 revealing any information that would be subject to a</p> <p>7 protective order, have you ever been retained by any</p> <p>8 of the plaintiff states in any other matter besides</p> <p>9 this case?</p> <p>10 MR. COLLIER: And that I would</p> <p>11 instruct you not to answer.</p> <p>12 That is an invasion of her</p> <p>13 consulting expert privilege.</p> <p>14 MR. HUNSBERGER: Instructing her</p> <p>15 not to answer either yes or no; correct?</p> <p>16 MR. COLLIER: It can't be answered</p> <p>17 yes or no without revealing the existence of</p> <p>18 any applicable consulting expert engagement.</p> <p>19 You've asked her, without waiving the</p> <p>20 privilege, are you a consulting expert</p> <p>21 anywhere.</p> <p>22 MR. HUNSBERGER: I understand the</p> <p>23 plaintiffs' position. I will move on.</p> <p>24 BY MR. HUNSBERGER:</p> <p>25 Q. Professor, when were you retained in</p>	<p style="text-align: right;">Page 37</p> <p>1 this matter at \$550 an hour.</p> <p>2 Is that still accurate?</p> <p>3 A. Yes.</p> <p>4 Q. Approximately how much time have you</p> <p>5 spent to date on this case?</p> <p>6 A. I'm not sure, but approximately 200</p> <p>7 hours.</p> <p>8 Q. Who is compensating you for your work on</p> <p>9 this matter?</p> <p>10 A. The State of Texas.</p> <p>11 Q. In the same paragraph 3 we were just</p> <p>12 talking about you indicated you were supported by a</p> <p>13 research team who has provided research support and</p> <p>14 assistance; is that correct?</p> <p>15 A. Yes.</p> <p>16 Q. Is that team from the Keystone</p> <p>17 consulting firm we talked about a moment ago?</p> <p>18 A. Yes. But my team also includes counsel.</p> <p>19 Q. Besides Keystone personnel and counsel,</p> <p>20 any other individuals who supported you in</p> <p>21 preparation of the report?</p> <p>22 A. No.</p> <p>23 Q. Other than counsel, how many individuals</p> <p>24 at Keystone supported you in preparing your report?</p> <p>25 A. I think there were five people involved.</p>

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<p style="text-align: right;">Page 38</p> <p>1 Q. Do you have an understanding of how many</p> <p>2 hours they have worked on the matter in aggregate</p> <p>3 across all five individuals?</p> <p>4 A. No. I don't keep track of my team's</p> <p>5 hours.</p> <p>6 Q. Do you receive any portion of the</p> <p>7 billings generated by your team?</p> <p>8 A. No.</p> <p>9 Q. So if Keystone bills the State of Texas</p> <p>10 at some hourly rate per hour, you do not receive</p> <p>11 some percentage of that as compensation?</p> <p>12 A. No.</p> <p>13 Q. The only compensation you receive is</p> <p>14 your 550-per-hour rate for how many hours you work;</p> <p>15 is that correct?</p> <p>16 A. Yes.</p> <p>17 Q. Did any of the personnel at Keystone</p> <p>18 draft any portions of your report?</p> <p>19 MR. COLLIER: Objection, Counsel.</p> <p>20 That's in violation of the court's order of</p> <p>21 December 13, 2023.</p> <p>22 And I will instruct you not to</p> <p>23 answer.</p> <p>24 BY MR. HUNSBERGER:</p> <p>25 Q. Did you conduct any interviews in this</p>	<p style="text-align: right;">Page 40</p> <p>1 That's a ballpark.</p> <p>2 Q. Across those approximately six meetings</p> <p>3 with counsel, how many total hours did you prepare</p> <p>4 for the deposition?</p> <p>5 MR. COLLIER: Counsel, I'm going to</p> <p>6 let her answer that, but I will note you're</p> <p>7 probably in violation of the court's order</p> <p>8 5.15 which only allows testimony as to the</p> <p>9 total hours. For all of her work. I will let</p> <p>10 her answer this question though.</p> <p>11 With that said, if you can approximate</p> <p>12 the total hours you spent in these meetings,</p> <p>13 you're free to do that?</p> <p>14 A. I can't remember.</p> <p>15 Q. At the prep sessions was anyone besides</p> <p>16 the states plaintiffs' counsel present?</p> <p>17 A. I don't think so.</p> <p>18 Q. Did you review documents in preparation</p> <p>19 for your deposition?</p> <p>20 A. Yes.</p> <p>21 Q. Approximately how many documents did you</p> <p>22 review in preparation for your deposition?</p> <p>23 MR. COLLIER: You can answer if you</p> <p>24 know.</p> <p>25 A. Maybe five.</p>
<p style="text-align: right;">Page 39</p> <p>1 matter in connection with preparing your report?</p> <p>2 A. No.</p> <p>3 Q. Were there any interviews that you</p> <p>4 wanted to conduct in this matter but did not get an</p> <p>5 opportunity to do?</p> <p>6 A. No.</p> <p>7 Q. What did you do to prepare for your</p> <p>8 deposition today?</p> <p>9 MR. COLLIER: Objection.</p> <p>10 You can generally say. Obviously</p> <p>11 don't disclose any communications with counsel</p> <p>12 or your team.</p> <p>13 A. I met with counsel, and I read.</p> <p>14 Q. And, again, without revealing the</p> <p>15 content or substance of any communications you may</p> <p>16 have had with counsel, who did you meet with?</p> <p>17 Counsel in this room?</p> <p>18 MR. COLLIER: You can answer that.</p> <p>19 A. I met with counsel in this room and</p> <p>20 remote.</p> <p>21 Q. How many times did you meet with</p> <p>22 counsel?</p> <p>23 MR. COLLIER: You can answer if you</p> <p>24 know.</p> <p>25 A. I can't remember. Maybe around six.</p>	<p style="text-align: right;">Page 41</p> <p>1 Q. Without disclosing any communications</p> <p>2 that you may have had with counsel, did counsel</p> <p>3 select those materials for you?</p> <p>4 MR. COLLIER: Objection. Counsel</p> <p>5 now you're in flagrant violation of paragraph</p> <p>6 5.1 of the court's order, communications</p> <p>7 between counsel and my testifying witnesses.</p> <p>8 This is at least the third time you violated</p> <p>9 this order.</p> <p>10 MR. HUNSBERGER: Counsel, I said</p> <p>11 without disclosing --</p> <p>12 MR. COLLIER: Did counsel select</p> <p>13 for you is a communication between counsel and</p> <p>14 my witness.</p> <p>15 MR. HUNSBERGER: Again, I was very</p> <p>16 specific, without disclosing any communication</p> <p>17 you may have had with counsel. If the</p> <p>18 instruction is she cannot answer that question</p> <p>19 without disclosing those, then we can move on.</p> <p>20 MR. COLLIER: That is my</p> <p>21 instruction and my firsthand knowledge that</p> <p>22 she can't answer the question without putting</p> <p>23 you in violation of the court's order.</p> <p>24 MR. HUNSBERGER: Counsel, again, to</p> <p>25 be very clear, I'm not intending to or</p>

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<p>1 attempting to violate the court's order, so we</p> <p>2 can move on from this question. I was very</p> <p>3 clear about not disclosing any communication</p> <p>4 she may have had with counsel.</p> <p>5 MR. COLLIER: Mr. Hunsberger, I</p> <p>6 want to be clear. When you ask her "What did</p> <p>7 you counsel tell you," it doesn't save you</p> <p>8 when you say "without disclosing</p> <p>9 communications with your counsel."</p> <p>10 I don't want to argue with you. I</p> <p>11 want you to spend your time with the</p> <p>12 deposition. But I want to make clear your</p> <p>13 intentions are irrelevant to me when you're</p> <p>14 violating the order.</p> <p>15 MR. HUNSBERGER: Counsel, to be</p> <p>16 clear, I did not ask her to disclose anything</p> <p>17 that she said to you or you said to her. But,</p> <p>18 again, we can move on.</p> <p>19 BY MR. HUNSBERGER:</p> <p>20 Q. I would like to direct your attention to</p> <p>21 paragraph 22 of your report.</p> <p>22 A. Okay.</p> <p>23 Q. Is this an accurate description of your</p> <p>24 assignment in this case?</p> <p>25 A. So that's a summary of opinions rather</p>	<p>1 A. This is a rebuttal report, so I read the</p> <p>2 expert reports that I needed to rebut very</p> <p>3 carefully, and the exhibits, the depositions, the</p> <p>4 other materials provided, and used my -- leveraged</p> <p>5 my machine learning and statistics expertise to</p> <p>6 form my opinions in order to write this report.</p> <p>7 Q. In preparing your rebuttal report you</p> <p>8 reviewed the expert reports of Professors Milgrom,</p> <p>9 Ghose, Wiggins and Baye; is that correct?</p> <p>10 A. As well as other reports, yes.</p> <p>11 Q. Beyond those four professors -- Milgrom,</p> <p>12 Ghose, Wiggins and Baye -- you did not offer any</p> <p>13 other rebuttal opinions; correct?</p> <p>14 A. As I mentioned earlier, there were</p> <p>15 information in other reports and other expert</p> <p>16 reports that are similar to those for instance in</p> <p>17 Milgrom, Ghose, Wiggins and Baye, and exhibits as</p> <p>18 well, and I offered opinions that could be relevant</p> <p>19 to those as well.</p> <p>20 Q. But you are not offering any rebuttal</p> <p>21 opinions against any experts other than Professors</p> <p>22 Milgrom, Ghose, Wiggins and Baye; correct?</p> <p>23 MR. COLLIER: Objection to the</p> <p>24 form.</p> <p>25 A. I believe I've already answered that</p>
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<p>1 than a summary of my assignment.</p> <p>2 Q. And the summary of your assignment, is</p> <p>3 that what is in paragraph 2?</p> <p>4 A. Yes.</p> <p>5 Q. Counsel for the State of Texas provided</p> <p>6 this assignment to you; is that correct?</p> <p>7 A. Yes.</p> <p>8 Q. You write in paragraph 22 that you were</p> <p>9 asked to apply your training and experience to</p> <p>10 analyze Google's machine learning programs from a</p> <p>11 statistical and optimization lens. You then list a</p> <p>12 few of Google's programs.</p> <p>13 Were there any other Google</p> <p>14 optimizations you analyzed that you didn't include</p> <p>15 here?</p> <p>16 A. Yes.</p> <p>17 Q. What were those optimizations?</p> <p>18 A. Well, they're listed throughout my</p> <p>19 report, but, for instance, throttling is not listed</p> <p>20 here, but it is relevant to all of these programs.</p> <p>21 Q. Do you consider throttling a Google</p> <p>22 product feature or optimization?</p> <p>23 A. I consider it a Google optimization.</p> <p>24 Q. At a high level, what did you do to</p> <p>25 develop your opinions for this assignment?</p>	<p>1 question.</p> <p>2 Q. Is that a yes?</p> <p>3 MR. COLLIER: Objection to the</p> <p>4 form.</p> <p>5 A. To the extent that there's overlapping</p> <p>6 content between expert reports and there's</p> <p>7 additional information, materials, my rebuttals are</p> <p>8 relevant to those as well.</p> <p>9 Q. But as stated in paragraph 22 and</p> <p>10 paragraph 2, you are rebutting the expert reports of</p> <p>11 Professor Milgrom, Professor Ghose, Professor</p> <p>12 Wiggins, and Professor Baye; correct?</p> <p>13 A. I am certainly rebutting -- not</p> <p>14 information -- content opinions of these reports.</p> <p>15 Q. In paragraphs 2 and 22 you don't list</p> <p>16 any other Google experts that you are responding to;</p> <p>17 correct?</p> <p>18 A. I don't list any -- in this paragraph</p> <p>19 I'm not listing anything except Milgrom, Ghose,</p> <p>20 Wiggins and Baye. But as I mentioned, my opinions</p> <p>21 are relevant to other Google reports that overlap</p> <p>22 with their opinions of these ones.</p> <p>23 Q. But your assignment was limited to a</p> <p>24 rebuttal of those four experts; correct?</p> <p>25 MR. COLLIER: Objection to the</p>

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<p style="text-align: right;">Page 46</p> <p>1 form.</p> <p>2 A. As I mentioned, the reports tend to</p> <p>3 overlap in their content and opinions, and so my</p> <p>4 rebuttals are relevant to additional reports.</p> <p>5 Q. I'm just asking a straightforward</p> <p>6 question, whether the assignment was limited to</p> <p>7 rebut the four experts that you list in paragraphs 2</p> <p>8 and 22?</p> <p>9 MR. COLLIER: Object to form.</p> <p>10 Counsel, asked and answered. I will allow her</p> <p>11 to answer one more time, because this is</p> <p>12 harassing.</p> <p>13 Go ahead.</p> <p>14 MR. HUNSBERGER: Counsel, the</p> <p>15 witness has not answered my question, so I'm</p> <p>16 just looking for a straightforward answer,</p> <p>17 which she's a rebuttal witness. Google has</p> <p>18 the right to confirm the experts to which she</p> <p>19 is responding.</p> <p>20 A. I'm doing my best to answer your</p> <p>21 question, which is that the Google reports had</p> <p>22 somewhat overlapping opinions, and so my rebuttal</p> <p>23 is relevant to additional reports.</p> <p>24 Q. Which other experts are your opinions</p> <p>25 relevant to?</p>	<p style="text-align: right;">Page 48</p> <p>1 A. Yes.</p> <p>2 Q. How did you pick which optimizations to</p> <p>3 focus on?</p> <p>4 A. I picked these programs based on my</p> <p>5 understanding of the reports that I needed to rebut</p> <p>6 and chose programs where my machine-learning</p> <p>7 expertise would be relevant in helping me rebut</p> <p>8 some of the expert opinions, including the ones</p> <p>9 that are listed in paragraphs 23 and 24, as well as</p> <p>10 the rest of that section.</p> <p>11 Q. And do you offer opinions on any other</p> <p>12 Google optimizations that are not listed in</p> <p>13 paragraph 22, other than throttling, which you</p> <p>14 mentioned earlier?</p> <p>15 A. Everything that I have mentioned is</p> <p>16 listed in my report. I could probably go through</p> <p>17 and, you know, find all the different Google</p> <p>18 conducts that were mentioned throughout the report</p> <p>19 if you would like.</p> <p>20 Q. You describe machine learning as a</p> <p>21 branch of artificial intelligence; is that correct?</p> <p>22 A. Yes.</p> <p>23 Q. Are you offering any opinions today on</p> <p>24 Google's use of any large language models?</p> <p>25 A. No.</p>
<p style="text-align: right;">Page 47</p> <p>1 A. Well, there are hundreds and thousands</p> <p>2 of pages of these reports, so I -- if I want me to,</p> <p>3 I could go through all the reports and I could</p> <p>4 pinpoint which opinions are overlapping with these</p> <p>5 four that my opinions are relevant to.</p> <p>6 Q. So if we look at paragraph 22, you refer</p> <p>7 to several Google product features.</p> <p>8 A. Sorry?</p> <p>9 Q. Paragraph 22.</p> <p>10 A. Paragraph 22.</p> <p>11 Q. You refer to several Google product</p> <p>12 features.</p> <p>13 You see, for example --</p> <p>14 A. Yes.</p> <p>15 Q. You see, for example, you list DRS,</p> <p>16 Project Bernanke, EDA, RPO, shifting from a</p> <p>17 second-price to first-price auction, Open Bidding,</p> <p>18 UPR and Alchemist, and you refer to those as,</p> <p>19 quote-unquote, "auction manipulations"; is that</p> <p>20 correct?</p> <p>21 A. That's correct.</p> <p>22 Q. During this deposition today if I use</p> <p>23 the term "optimizations" or "product features" to</p> <p>24 describe what you refer to as "Google's auction</p> <p>25 manipulations," will you understand what I mean?</p>	<p style="text-align: right;">Page 49</p> <p>1 Q. So you're not offering any opinion today</p> <p>2 on Google's use of large language models, such as</p> <p>3 Google's Gemini?</p> <p>4 A. No.</p> <p>5 Q. How did you go about selecting the</p> <p>6 materials to cite in your report as what you relied</p> <p>7 upon?</p> <p>8 MR. COLLIER: Objection to the</p> <p>9 form.</p> <p>10 A. Well, my team and I read the -- started</p> <p>11 with the expert reports of Milgrom, Ghose, Wiggins</p> <p>12 and Baye, and we read those reports, as well as the</p> <p>13 exhibits, as well as looking through the database</p> <p>14 of documents that we had that were relevant to what</p> <p>15 we were looking for, and chose supporting points --</p> <p>16 chose documents to cite that were relevant to those</p> <p>17 points.</p> <p>18 Q. You had access to all of the documents</p> <p>19 produced in this case; is that correct?</p> <p>20 A. Yes.</p> <p>21 Q. You had access to all of the deposition</p> <p>22 transcripts in this case; is that correct?</p> <p>23 A. Yes.</p> <p>24 Q. You also had access to all of the data</p> <p>25 productions in this case; is that correct?</p>

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<p style="text-align: right;">Page 50</p> <p>1 A. I didn't use any data in the sense of, 2 like, numerical tables to produce this, except for 3 what was produced in the Google -- the database of 4 all of the reports that -- in other words, I didn't 5 do any code review, if that's what you are asking. 6 But I did review the database of Google documents, 7 if that helps. 8 Q. You had access to Google's transaction 9 data in this case; is that correct? 10 A. I had access to a very minimal amount of 11 Google transaction data. 12 Q. Are there any documents, data or other 13 materials that you relied upon to form your opinions 14 that are not listed or cited in your report? 15 A. I relied on my knowledge of machine 16 learning and statistics which were gained through 17 many documents through many years. 18 Q. That's fair. 19 Are there any -- other than that, are 20 there any documents, data or other materials that 21 you relied upon to form your opinions that are not 22 listed or cited in your report? 23 A. I may have done internet searches to 24 gain knowledge. 25 Q. Did you rely on those internet searches</p>	<p style="text-align: right;">Page 52</p> <p>1 rely on additional documents, including transcripts, 2 and testimony in conducting my work and forming my 3 opinions in this case." 4 Do you see that? 5 A. Yes. 6 Q. Have you reviewed any other materials, 7 such as documents or transcripts, since submitting 8 your rebuttal report? 9 A. No. 10 MR. COLLIER: Pause just a moment. 11 I was going to object to form. But it's okay, 12 you've said no. 13 THE WITNESS: That's fine. 14 Q. You have not provided any supplemental 15 report other than just this report you submitted on 16 September 9; correct? 17 A. Correct. 18 Q. Was there any additional analysis that 19 you wanted to undertake in connection with forming 20 your opinions in this matter but did not do? 21 A. No. 22 Q. Were you provided any assumptions that 23 you relied on in forming the opinions in your 24 report? 25 A. No.</p>
<p style="text-align: right;">Page 51</p> <p>1 to form your opinions? 2 MR. COLLIER: Objection to the 3 form. 4 You can answer. 5 A. I learned things -- I always learn 6 things from internet searches, so I could rely on 7 those, if that's what you are asking. 8 Q. Any other documents, data or materials 9 produced by a party in this case that you relied on 10 that are not listed in your report? 11 A. I don't believe so. 12 You mean that are not publicly 13 available, correct. 14 Q. I was asking simply about -- 15 party-produced documents, data or other materials. 16 But I can ask now specifically about are 17 there any other publicly available materials that 18 you relied upon in forming your opinions that are 19 not listed in your report? 20 A. As I said, I may have done internet 21 searches to find -- to understand something a bit 22 better. But anything that's cited, we did our best 23 to try to cite things that supported the opinions. 24 Q. In paragraph 5 of your report you state 25 that you "may, and reserve the right to, review and</p>	<p style="text-align: right;">Page 53</p> <p>1 Q. Were you provided any facts that you 2 relied on in forming the opinions in your report? 3 MR. COLLIER: Objection. Vague. 4 Q. Were you provided any facts other than 5 documents data and other materials that you relied 6 on in forming your opinions in the report? 7 MR. COLLIER: Still objection, 8 vague. 9 You can answer if you understand. 10 A. I don't understand, I'm sorry. Maybe 11 you could explain what types of facts? Provided by 12 who? What you mean. 13 MR. HUNSBERGER: So, Counsel, again 14 just to be clear, just trying to get the one 15 issue that is permitted under the expert 16 stipulation in this matter. 17 Q. Were you provided any facts by counsel 18 that you relied on in forming the opinions in your 19 report? 20 MR. COLLIER: You can answer that 21 question. 22 A. I'm not allowed to reveal conversations 23 with my counsel. 24 MR. COLLIER: I can -- I will 25 authorize her to answer that question. I can</p>

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<p>1 chat with her -- this involves -- she thinks</p> <p>2 she's going to violate a privilege because I</p> <p>3 told her not to discuss -- would you like me</p> <p>4 to tell her that she's allowed to your answer.</p> <p>5 I don't want to be accused of leading the</p> <p>6 witness. I want you to get an answer.</p> <p>7 MR. HUNSBERGER: I appreciate that,</p> <p>8 Counsel. And we're all trying to be careful</p> <p>9 here with privilege and the stipulation. So</p> <p>10 yes, can you provide her context.</p> <p>11 MR. COLLIER: While he's not</p> <p>12 allowed to ask about our conversations, he is</p> <p>13 allowed to ask if counsel told you I need you</p> <p>14 to treat as a fact that Google does X, Y, Z,</p> <p>15 and then you took what counsel told you as a</p> <p>16 fact for purposes of your analysis. He wants</p> <p>17 to know, did you do any of that.</p> <p>18 A. Okay. No, I don't take what people say</p> <p>19 as fact. I read very carefully for myself.</p> <p>20 Q. So there was no circumstance, as</p> <p>21 Mr. Collier alluded to, in which counsel said treat</p> <p>22 something as a fact and you accepted that fact and</p> <p>23 you relied upon that as a fact in forming your</p> <p>24 opinions; is that correct?</p> <p>25 A. I would not do that with anyone.</p>	<p>1 few definitions to make sure we're all on the same</p> <p>2 page and things go a little smoother.</p> <p>3 There are, as you know, many</p> <p>4 abbreviations, many acronyms, many terms of art in</p> <p>5 the ad tech industry, and I want to make we're using</p> <p>6 the terms in a way with a common understanding.</p> <p>7 When you refer in your report to a</p> <p>8 "DSP," that refers to a demand-side platform; is</p> <p>9 that correct?</p> <p>10 A. Yes.</p> <p>11 Q. What is an example of a DSP in the</p> <p>12 ad tech industry?</p> <p>13 A. Google's demand-side platforms perhaps.</p> <p>14 Q. What Google tool or tools do you</p> <p>15 understand to be a demand platform?</p> <p>16 A. I mean, Google's demand side includes</p> <p>17 Google Ads or -- I could go through and -- I don't</p> <p>18 have a full list of all the Google demand-side</p> <p>19 things in here. I list several of them throughout.</p> <p>20 But you can go to Professor Gans or Professor</p> <p>21 Weinberg for a more complete list of Google's</p> <p>22 demand-side platform information.</p> <p>23 Q. You mentioned Google Ads as a Google</p> <p>24 demand-side tool.</p> <p>25 Does Google have any other demand-side</p>
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<p>1 MR. HUNSBERGER: Counsel, we've</p> <p>2 been going for an hour. Good time for a</p> <p>3 break?</p> <p>4 MR. COLLIER: If it's good for you,</p> <p>5 it's good for us.</p> <p>6 THE VIDEOGRAPHER: Going off the</p> <p>7 record. The time is 10:14 a.m.</p> <p>8 (Recess taken.)</p> <p>9 THE VIDEOGRAPHER: Going back on</p> <p>10 the record. The time is 10:28 a.m.</p> <p>11 BY MR. HUNSBERGER:</p> <p>12 Q. Professor Rudin, when we were talking</p> <p>13 earlier, we talked about your analysis of various</p> <p>14 Google programs. And I just want to ask, did you do</p> <p>15 any analysis of any company's ad tech products or</p> <p>16 programs for any other company besides Google, any</p> <p>17 third-party companies?</p> <p>18 A. No.</p> <p>19 Q. So we've handled some of the</p> <p>20 preliminaries. I think we're past those, so we will</p> <p>21 sort of dive into the substance, which I hope will</p> <p>22 be more interesting for you, and certainly given</p> <p>23 your area of expertise.</p> <p>24 Before we begin I want to make sure</p> <p>25 we're all speaking the same language and get out a</p>	<p>1 tools?</p> <p>2 A. Yes.</p> <p>3 Q. What are those other demand-side tools?</p> <p>4 A. So let's go to -- they list a couple of</p> <p>5 them. I can't list all of them. I can list a</p> <p>6 couple.</p> <p>7 So DB360 -- like I said, this report</p> <p>8 focuses on kind of overall aspects of the way these</p> <p>9 things relate to each other, and if you want more</p> <p>10 specifics about Google's, you know, properties and</p> <p>11 so on, all of the things Google has, then you are</p> <p>12 better off looking at the Weinberg or Gans reports</p> <p>13 or some of the other reports.</p> <p>14 MR. COLLIER: Counsel, I tried not</p> <p>15 to interrupt, but there's someone I don't</p> <p>16 recognize on the Zoom. It's your confidential</p> <p>17 information --</p> <p>18 THE VIDEOGRAPHER: It's William</p> <p>19 Shieber.</p> <p>20 MR. COLLIER: I want to be careful,</p> <p>21 since we're discussing --</p> <p>22 MR. HUNSBERGER: I appreciate it,</p> <p>23 Counsel.</p> <p>24 MR. COLLIER: For the court</p> <p>25 reporter, William Shieber from the Texas</p>

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<p>1 Attorney's General Office has joined on the</p> <p>2 Zoom.</p> <p>3 I don't know that other name, A.</p> <p>4 Freeborn.</p> <p>5 MR. HUNSBERGER: That's Andrew</p> <p>6 Freeborn from Axinn, Veltrop & Harkrider, also</p> <p>7 on behalf of Google.</p> <p>8 Thank you, Counsel, for being</p> <p>9 sensitive to information confidential to me.</p> <p>10 MR. COLLIER: I tried to wait until</p> <p>11 I didn't interrupt you. I apologize.</p> <p>12 BY MR. HUNSBERGER:</p> <p>13 Q. In Section III of your report, Professor</p> <p>14 Rudin, you describe a hypothetical auction between</p> <p>15 buyers and sellers; is that correct?</p> <p>16 A. Yes.</p> <p>17 Q. If you'll turn to that section,</p> <p>18 paragraph 54, page 19.</p> <p>19 A. Okay.</p> <p>20 Q. Subheading A1 in that section has a</p> <p>21 subheading that reads, "Buyer constructs an ML model</p> <p>22 in my ML Abstracted Auction."</p> <p>23 Do you see that?</p> <p>24 A. Yes.</p> <p>25 Q. When you say "buyer" are you referring</p>	<p>1 auction we might be talking about Google Ads</p> <p>2 bidding into the AdX auction.</p> <p>3 Q. Is it fair to say depending on the</p> <p>4 context you sometimes use "buyer" to refer to</p> <p>5 individual advertisers and sometimes you use "buyer"</p> <p>6 to refer to demand-side tools?</p> <p>7 A. Yes. And sometimes buyer is completely</p> <p>8 abstract as well, because we have the abstract</p> <p>9 version.</p> <p>10 Q. Understood.</p> <p>11 So to help make sure that we're clear</p> <p>12 and on the same page as we're going through</p> <p>13 different sections of your report, if we could just</p> <p>14 try to be clear in which way you are using "buyer";</p> <p>15 whether you are using it to refer to individual</p> <p>16 advertisers or to refer to demand-side tools or</p> <p>17 using it in the abstract sense. I think that would</p> <p>18 be helpful for the clarity of the record.</p> <p>19 MR. COLLIER: Dr. Rudin, you</p> <p>20 nodded --</p> <p>21 Q. You understand what I'm saying?</p> <p>22 A. Oh, yes. I will try to be clear.</p> <p>23 MR. COLLIER: I was just reminding</p> <p>24 you what he told you earlier. He asked you</p> <p>25 that question, you nodded, he saw your nod, he</p>
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<p>1 to advertisers?</p> <p>2 A. So this is an abstract auction, so it</p> <p>3 can be any buyer in any auction. It's an abstract</p> <p>4 auction.</p> <p>5 Q. When you later apply the learnings from</p> <p>6 your abstract auction to Google's products, when you</p> <p>7 use the word "buyer" are you referring to</p> <p>8 advertisers?</p> <p>9 A. Yes.</p> <p>10 Q. And you're referring to advertisers and</p> <p>11 not to DSP tools, or are you using them</p> <p>12 interchangeably? I want to make sure we understand</p> <p>13 the word "buyer" as used in your report.</p> <p>14 A. So there's advertisers, and then there's</p> <p>15 also -- there's also tools that -- bidding tools.</p> <p>16 So the advertisers can work with the bidding tools</p> <p>17 to place bids into the auction.</p> <p>18 Q. So when you use the term "buyer"</p> <p>19 throughout your report are you referring to the</p> <p>20 advertisers?</p> <p>21 A. It depends which auction you're talking</p> <p>22 about. So if you're referring to, like -- like,</p> <p>23 later in the report we talk about the internal</p> <p>24 auction. Right? There are individual advertisers.</p> <p>25 And then if we're talking about kind of the AdX</p>	<p>1 moved on. But the court reporter isn't able</p> <p>2 to take down nods. You have to say "yes."</p> <p>3 THE WITNESS: It wasn't a question.</p> <p>4 MR. HUNSBERGER: That's fair. We</p> <p>5 can -- Counsel, I appreciate your</p> <p>6 attentiveness, and I am sure the court</p> <p>7 reporter does as well.</p> <p>8 BY MR. HUNSBERGER:</p> <p>9 Q. Just wanted to make sure we understood</p> <p>10 that when we're using the term "buyer" and we're</p> <p>11 having this conversation, we will be try to be</p> <p>12 clear -- you will try to be clear and I will try to</p> <p>13 be clear whether we're referring to a specific</p> <p>14 individual advertiser, referring to demand-side</p> <p>15 tools or using it in the abstract sense.</p> <p>16 Is that fair?</p> <p>17 A. I will try my best to be clear.</p> <p>18 Q. In subheading A2 on page 21, the</p> <p>19 subheading reads "Seller constructs an ML model in</p> <p>20 my ML Abstracted Auction."</p> <p>21 Do you see that?</p> <p>22 A. Yes.</p> <p>23 Q. When you say "seller" in the context of</p> <p>24 your report when you're discussing Google's products</p> <p>25 in the advertising technology industry, you are</p>

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<p style="text-align: right;">Page 62</p> <p>1 referring to publishers; is that correct?</p> <p>2 A. Later in the report I refer to sellers</p> <p>3 at publishers.</p> <p>4 Q. What is an example of a seller in the</p> <p>5 ad tech industry?</p> <p>6 A. An example of a seller might be The New</p> <p>7 York Times.</p> <p>8 Q. In Section A3 of your report on page 22</p> <p>9 there is a subheading entitled "Auctioneer's Role";</p> <p>10 is that right?</p> <p>11 A. Yes.</p> <p>12 Q. Later in your report you apply your</p> <p>13 abstract model involving an auctioneer to Google's</p> <p>14 products; is that correct?</p> <p>15 A. Yes.</p> <p>16 Q. When you refer to an "auctioneer" in the</p> <p>17 context of Google's products which specific Google</p> <p>18 tool or tools are you referring to?</p> <p>19 A. AdX.</p> <p>20 Q. Any other Google tools that you're</p> <p>21 referring to when you use the term "auctioneer"?</p> <p>22 A. There are several Google tools that --</p> <p>23 they're the same tool, essentially, with different</p> <p>24 names, and I don't remember all of them off the top</p> <p>25 of my head. But it's essentially AdX. AdX and its</p>	<p style="text-align: right;">Page 64</p> <p>1 I think they want to have high-quality ads and not</p> <p>2 just maximize short-term revenue. I think they</p> <p>3 want to maximize long-term revenue. They want to</p> <p>4 maintain their reputation. So I don't think I</p> <p>5 would agree with the suggestion that all they're</p> <p>6 trying to do is maximize short-term revenue.</p> <p>7 Q. I was not attempting to suggest only</p> <p>8 maximizing short-term revenue, so let me try asking</p> <p>9 the question again.</p> <p>10 Is it fair to say that if you hold</p> <p>11 quality and reputation constant, publishers</p> <p>12 generally try to maximize their ad revenue?</p> <p>13 A. So maximizing your ad revenue could be</p> <p>14 short term, could be long term, and those are tied</p> <p>15 into the things you try to keep constant, so it's</p> <p>16 not possible to separate these things out.</p> <p>17 Q. So if we're talking about a given piece</p> <p>18 of publisher inventory, if the publisher has the</p> <p>19 ability to receive \$4 for that piece of inventory or</p> <p>20 the opportunity to receive \$5 for that piece of</p> <p>21 inventory -- the same inventory, same level of</p> <p>22 quality -- the publisher would generally prefer to</p> <p>23 receive the \$5 over \$4; is that fair?</p> <p>24 A. So again you are excluding the rest of</p> <p>25 the context around this particular auction. So it</p>
<p style="text-align: right;">Page 63</p> <p>1 relatives. We'll say that.</p> <p>2 Q. AdX and its relatives?</p> <p>3 A. Um-hmm.</p> <p>4 Q. What are AdX's relatives? I want to</p> <p>5 make sure I understand what you mean by that.</p> <p>6 A. It's AdX, its aliases. I mean, here I'm</p> <p>7 talking about an abstract auction, so it can be any</p> <p>8 auctioneer, but I mostly am talking about AdX.</p> <p>9 Q. Are you referring to any other Google</p> <p>10 tools besides AdX?</p> <p>11 A. I think I'm referring mostly to AdX in</p> <p>12 this report.</p> <p>13 Q. So before we dive in a bit more into the</p> <p>14 details of your report, I would like to take a step</p> <p>15 back and have a conversation from a bigger picture</p> <p>16 perspective and talk about some issues in the ad</p> <p>17 tech industry overall.</p> <p>18 Based on your review of the materials in</p> <p>19 this case and your understanding of the advertising</p> <p>20 technology industry, is it fair to say that, all</p> <p>21 else equal, publishers generally try to maximize</p> <p>22 their ad revenue?</p> <p>23 MR. COLLIER: Objection to the</p> <p>24 form.</p> <p>25 A. I think publishers can have many goals.</p>	<p style="text-align: right;">Page 65</p> <p>1 may be that the audience is not the right target</p> <p>2 audience and they don't want -- it could be that</p> <p>3 there's a long-term reputation damage from doing</p> <p>4 this.</p> <p>5 So I just -- I don't really want to</p> <p>6 agree to these hypotheticals without the rest of</p> <p>7 the context.</p> <p>8 Q. So the rest of the context is the same</p> <p>9 advertiser, the same user, the same ad, the same ad</p> <p>10 quality. The only difference is does the publisher</p> <p>11 receive \$4 for that inventory or does the publisher</p> <p>12 receive \$5 for that inventory.</p> <p>13 MR. COLLIER: Objection.</p> <p>14 Go ahead.</p> <p>15 A. It's hard to isolate these very narrow</p> <p>16 circumstances when there's a much broader set of</p> <p>17 things the publisher might want to consider.</p> <p>18 Q. What else would the publisher want to</p> <p>19 consider?</p> <p>20 A. The publisher might want to consider the</p> <p>21 long-term reputation of -- you know, the publisher</p> <p>22 wants to keep the -- certain types of ads to keep</p> <p>23 the value of their property. The publisher might</p> <p>24 want to consider who the target -- who the target</p> <p>25 audience would be for these ads. The publisher</p>

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<p style="text-align: right;">Page 66</p> <p>1 might want to consider -- there's many things the 2 publisher might want to consider that is not listed 3 in the context there. 4 Q. So you refer to long-term reputation and 5 target audience as two other considerations that 6 publishers may want to take into account. 7 In my question, again, I'm assuming the 8 same advertiser, the same user, the same ad, and the 9 same quality of the ad. 10 So in that context, would the publisher 11 rather have the \$4 for that same piece of inventory 12 for the same ad, the same user, with the same 13 quality, or would it rather have the \$4 [sic]? 14 MR. COLLIER: Objection to the 15 form. 16 A. Again -- let's say that that 17 publisher -- you're not giving me the full context. 18 So there could be a context in which that would not 19 be true. 20 Q. What is that context in which that could 21 be true? 22 MR. COLLIER: Objection to the 23 form. 24 A. So let's say that the publisher is 25 unhappy with the auctioneer's rules and doesn't</p>	<p style="text-align: right;">Page 68</p> <p>1 Q. And to help advertisers and publishers 2 achieve their goals in the ad tech industry, both 3 advertisers and publishers can in some instances 4 turn to ad tech intermediaries; correct? 5 MR. COLLIER: Objection to the 6 form. 7 Go ahead. 8 A. Correct. 9 Q. On the buy side of the ad tech industry, 10 buy-side tools help advertisers buy opportunities to 11 display their advertisements to users; is that 12 correct? 13 A. Could you just repeat the question? 14 Q. On the buy side of the ad tech industry, 15 buy-side tools help advertisers buy opportunities to 16 display their advertisements to users; is that 17 correct? 18 A. Yes. 19 Q. If we look at paragraph 54 of your 20 report, the second sentence there refers to buyers, 21 quote, "are unwilling to bid above their valuation 22 and would like to bid as low as possible." 23 MR. COLLIER: Objection to the 24 form. 25 Q. Do you see that, Professor Rudin?</p>
<p style="text-align: right;">Page 67</p> <p>1 particularly want to accept bids from that 2 auctioneer because the auctioneer is not providing 3 it with some information. So perhaps they would 4 prefer not to have that particular ad sold by that 5 auctioneer and might prefer to have that ad sold 6 for a different price by a different auctioneer 7 even if it's lower. 8 Q. If we look at paragraph 62 of your 9 report, the third sentence of the paragraph, last 10 sentence, reads, "To maximize their revenue, 11 they" -- meaning publishers -- "want to set the 12 floor price as close as possible to what the buyer 13 who values the auction item most is willing to pay." 14 Do you see that? 15 A. Yes. 16 Q. Fair to say that one goal of publishers 17 is to maximize their revenue? 18 A. One goal of publishers is to maximize 19 their revenue. 20 Q. On the other side of the ad tech 21 industry, fair to say that advertisers want to 22 maximize their return on their advertising spend? 23 A. One goal of advertisers would be to, 24 yeah, maximize their return on their advertising 25 spend.</p>	<p style="text-align: right;">Page 69</p> <p>1 A. Yes. 2 Q. So all else equal, advertisers would 3 prefer to buy advertising opportunities for a lower 4 cost than a higher cost; is that correct? 5 A. Generally, yes. 6 Q. Would you agree that, all else equal, 7 publishers would prefer to sell their ad slots 8 rather than see those ad slots go unsold? 9 A. Not necessarily. There's reputational 10 issues, as I mentioned. 11 Q. If we hold quality and reputation 12 constant, publishers would prefer to sell their ad 13 slots rather than see those ad slots go unsold; 14 correct? 15 MR. COLLIER: Objection to the 16 form. 17 A. Again, I have answered this earlier that 18 there could be an issue that the publisher has with 19 the auctioneer and would perhaps want to work with 20 a different auctioneer that maybe will give them 21 some additional data or additional benefit. So it 22 really depends on the context. 23 Q. As we discussed a moment ago, Google Ads 24 is Google's bidding tool; correct? 25 A. Correct. It's one of Google's bidding</p>

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<p>1 tools.</p> <p>2 Q. And AdX is Google's ad exchange, as we</p> <p>3 talked about earlier?</p> <p>4 A. Yes.</p> <p>5 Q. On a very basic level, Google Ads only</p> <p>6 earns revenue when its advertisers clear</p> <p>7 transactions; correct?</p> <p>8 MR. COLLIER: Objection to the</p> <p>9 form.</p> <p>10 A. I'm not an expert in exactly when Google</p> <p>11 earns, you know -- the only earned money when this</p> <p>12 happens, I'm not expert on that. But I do know I</p> <p>13 read a lot of documents that say that when there</p> <p>14 are transaction Google Ads gets to keep some of it.</p> <p>15 Q. And you're not aware of any instances in</p> <p>16 which Google Ads makes money when it doesn't clear a</p> <p>17 transaction; correct?</p> <p>18 A. I'm not representing Google here, so I</p> <p>19 can't tell you what Google Ads' deals are with</p> <p>20 other people.</p> <p>21 Q. But based on the extensive record in</p> <p>22 this case -- you have had access to millions of</p> <p>23 documents and data and deposition testimony in this</p> <p>24 case -- you haven't seen anything in the record that</p> <p>25 indicates Google Ads earns revenue when</p>	<p>1 clearing price.</p> <p>2 MR. HUNSBERGER: Sorry, can we go</p> <p>3 off the record for a minute.</p> <p>4 THE VIDEOGRAPHER: Going off the</p> <p>5 record. The time is 10:52 a.m.</p> <p>6 (Recess taken.)</p> <p>7 THE VIDEOGRAPHER: Going back on</p> <p>8 the record. The time is 11:07 a.m.</p> <p>9 MR. COLLIER: Counsel, just to note</p> <p>10 for the record, Alex Abston had to drop off</p> <p>11 the Zoom, but Eric Janitens from Norton Rose</p> <p>12 Fulbright and Melonie DeRose from The Lanier</p> <p>13 Law Firm, both of course covered by the</p> <p>14 protective order, have joined.</p> <p>15 BY MR. HUNSBERGER:</p> <p>16 Q. Before we had our technical issue with</p> <p>17 the realtime transcript we were talking about</p> <p>18 Google's ad exchange called AdX.</p> <p>19 Do you recall that?</p> <p>20 A. Yes.</p> <p>21 Q. When transactions clear on AdX, is it</p> <p>22 your understanding that publishers receive a</p> <p>23 percentage of the revenue from that transaction?</p> <p>24 A. Yes.</p> <p>25 Q. Is it your understanding that AdX also</p>
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<p>1 transactions do not clear; correct?</p> <p>2 A. I've not seen anything that says that,</p> <p>3 but that doesn't mean Google Ads doesn't have some</p> <p>4 additional complication that I haven't seen.</p> <p>5 Q. When publisher inventory is sold using</p> <p>6 Google Ads, is it your understanding that publishers</p> <p>7 receive a percentage of the revenue for that</p> <p>8 inventory?</p> <p>9 A. Yes.</p> <p>10 Q. So when transactions clear on Google</p> <p>11 Ads, that leads to a monetary benefit for publishers</p> <p>12 as well as Google; correct?</p> <p>13 A. Not necessarily because that's Google</p> <p>14 Ads, that's an internal option and you'd have to go</p> <p>15 to AdX.</p> <p>16 Q. And AdX, like Google Ads, only makes</p> <p>17 money when transactions clear on the exchange;</p> <p>18 correct?</p> <p>19 A. Sorry, could you repeat the question?</p> <p>20 Q. Like Google Ads, AdX only makes money</p> <p>21 when transactions clear on the exchange; correct?</p> <p>22 A. Like I said, I don't know exactly all</p> <p>23 the complications of when Google's things make</p> <p>24 money, but I've seen evidence that when</p> <p>25 transactions clear AdX does take part of that</p>	<p>1 receives a percentage of the revenue from that</p> <p>2 transaction?</p> <p>3 A. Yes.</p> <p>4 Q. So when transactions clear on AdX, both</p> <p>5 publishers and Google receive revenue; correct?</p> <p>6 A. Yes.</p> <p>7 Q. As we discussed a few minutes ago before</p> <p>8 our technical issue, both advertisers and publishers</p> <p>9 can use ad tech intermediaries; correct?</p> <p>10 A. Yes.</p> <p>11 Q. And those can include buying tools for</p> <p>12 advertisers; correct?</p> <p>13 A. Yes.</p> <p>14 Q. And publisher ad servers or ad exchanges</p> <p>15 for publishers; correct?</p> <p>16 A. Yes.</p> <p>17 Q. And based on your understanding of the</p> <p>18 ad tech industry from materials you've reviewed in</p> <p>19 this case, there are multiple buying tools that</p> <p>20 advertisers can use; correct?</p> <p>21 A. Yes.</p> <p>22 Q. And there are multiple ad servers and ad</p> <p>23 exchanges that publishers can use; correct?</p> <p>24 A. I don't know the answer to that</p> <p>25 question.</p>

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<p style="text-align: right;">Page 74</p> <p>1 Q. Are you aware if there are other ad 2 exchanges other than AdX? 3 A. There are other ad exchanges. 4 Q. Buying tools for advertisers and 5 ad exchanges for publishers, the firms that offer 6 those functionalities compete on a number of 7 dimensions; is that fair? 8 A. The word "compete" has a technical 9 definition that - you know, I'm not an expert in 10 competition law, whatever. So I can't -- I don't 11 really want to weigh into that. 12 Q. Fair to say that ad exchanges and buying 13 tools have various characteristics that they use to 14 market their products to advertisers and publishers? 15 A. I don't know how they market their 16 products. 17 Q. In selecting an ad tool, ad buying tool, 18 fair to say that buyers consider price as one 19 dimension of the product? 20 MR. COLLIER: Object. Form. 21 A. Again, I'm not an expert on what 22 advertisers consider when they're choosing buying 23 tools. 24 Q. Is it fair to say that publishers 25 consider price as one dimension of their product</p>	<p style="text-align: right;">Page 76</p> <p>1 A. I would refer to some of the other 2 experts' reports for that information. 3 Q. You don't have any discussion in your 4 report about switching costs; correct? 5 A. I have maybe one or two sentences on 6 switching. 7 Q. But not switching costs; correct? 8 A. Well, it's relevant to switching costs. 9 Right? 10 Q. Do you offer any opinion specifically on 11 switching costs in your report? 12 A. As I said, there's a couple of sentences 13 in my report where switching costs are relevant to 14 the opinions. 15 Q. In your report you indicate that both 16 publishers and advertisers and ad tech 17 intermediaries may use machine-learning models to 18 optimize their strategy; is that correct? 19 A. Yes. 20 Q. In your summary of opinions, going back 21 to paragraph 25 of your report, you offer the 22 opinion that, quote, "due to Google's auction 23 manipulations, sellers and buyers would not be able 24 to experiment to arrive at optimal strategies" for 25 the reasons that you list here; is that correct?</p>
<p style="text-align: right;">Page 75</p> <p>1 choice? 2 MR. COLLIER: Object. Form. 3 Go ahead. 4 A. Again, I'm not an expert on what 5 publishers choose in terms of their choice of 6 tools. Price I would assume would be one 7 dimension, but there are many others. 8 Q. What are those other dimensions? 9 A. Well, an important one is the switching 10 cost. 11 Q. What do you understand "switching cost" 12 to mean? 13 A. The cost to switch who your tool is. 14 Q. You mentioned earlier that you are not 15 an expert in economics. 16 Are you offering an opinion on switching 17 costs from a computer science perspective? 18 A. No. You asked me what are the other 19 things publishers might consider, and I'm telling 20 you what I found in documents, and I'm just 21 repeating those things. 22 Q. Do you offer any opinion in this case on 23 switching costs? 24 MR. COLLIER: Object. Form. 25 Go ahead.</p>	<p style="text-align: right;">Page 77</p> <p>1 A. It says "at least the following 2 reasons." 3 Q. For Google's supposed auction 4 manipulations to be the cause of customers' 5 inability to experiment to arrive at optimal 6 strategies the customers must have been able to do 7 the experiments to arrive at optimal strategies but 8 for Google's auctions; correct? 9 MR. COLLIER: Object. Form. 10 A. That's a confusing question. Can you 11 try saying it again? 12 Q. Is it your opinion that Google's 13 supposed auction manipulations are the cause of 14 customers' inability to experiment to arrive at 15 optimal strategies? 16 A. I believe many of the Google conducts 17 lead to experimentation being -- leading -- sorry, 18 give me one second. I'm going to read what it says 19 here. 20 Yeah, due to Google's auction 21 manipulations, sellers and buyers would not be able 22 to experiment to arrive at optimal strategies, and 23 I gave several reasons, many reasons throughout 24 this report. 25 Q. So is it your opinion that Google's</p>

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<p>1 conduct is the cause of customers' inability to 2 experiment to arrive at optimal strategies? 3 A. Yes, Google's conducts are the reasons, 4 are reasons why sellers and buyers are not able to 5 experiment to arrive at optimal strategies. 6 Q. Do you have any evidence that prior to 7 the conduct by Google that you described in your 8 report, sellers and buyers could experiment to 9 arrive at optimal strategies? 10 MR. COLLIER: Object. Form. 11 You can answer. 12 A. I have evidence that certain Google -- 13 before certain Google conducts it was much easier 14 to conduct experiments that were much more 15 effective in finding optimal strategies. 16 Q. Could you point me to the evidence in 17 your report? 18 MR. COLLIER: Objection. Form. 19 Go ahead. 20 A. There's a lot of -- there's a lot of 21 evidence throughout my report on this. I will give 22 an example. 23 Maybe the decoupling of the different 24 data files, for instance, would prevent sellers 25 from, you know, receiving information that they</p>	<p>1 And I'm trying to understand the relative baseline 2 against which you're comparing what was more 3 difficult or easier. 4 So what I'm asking is if you have any 5 evidence that prior to the conduct that you analyze 6 in your report sellers and buyers were able to 7 experiment to arrive at optimal strategies. 8 MR. COLLIER: Object. Form. 9 A. My report talks about the conducts that 10 make experiments more difficult. I don't opine on 11 anything that happened outside of, you know, like, 12 way before any of these conducts. 13 Q. In your report do you cite any evidence 14 that advertisers or publishers were actually using 15 machine-learning models to optimize their ad 16 strategies prior to Google's conduct? 17 A. Sorry. Could you repeat the question? 18 Q. In your report do you cite any evidence 19 that advertisers or publishers were using 20 machine-learning models to optimize their ad 21 strategies prior to the conduct you analyze? 22 A. Let's go through my report and try to 23 answer the question. So I can go through the 24 report and try to find if there are any citations 25 to machine learning in ad tech before the conduct</p>
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<p>1 would need to effectively conduct experiments. 2 Would you like me to give more examples? 3 Q. We can start with that example. We may 4 come back to other examples. 5 Is it your opinion that prior to the 6 decoupling of the different data files that 7 Google -- strike that. Let me start again. 8 Is it your opinion that prior to the 9 decoupling of the different data files buyers and 10 sellers were able to conduct experiments to arrive 11 at optimal strategies? 12 A. No. Because this happened in 2019, and 13 there were many Google conducts before that that 14 led to the compromise of the experiments. 15 Q. Do you have any evidence that prior to 16 any of the conduct described in your report that 17 sellers and buyers were able to experiment to arrive 18 at optimal strategies? 19 A. Can you explain your question in more 20 detail? I know that Google's conduct made 21 experiments much more difficult to conduct to come 22 up with optimal strategies. 23 Q. What I'm trying to understand is you 24 describe Google's conduct, in your opinion, made it 25 more difficult to come up with optimal strategies.</p>	<p>1 started. 2 (Witness reviews document.) 3 BY MR. HUNSBERGER: 4 Q. Professor Rudin, have you identified 5 anything -- 6 MR. COLLIER: Counsel, she's 7 still -- you asked, "In your report do you 8 cite." 9 She's still reviewing her report. 10 MR. HUNSBERGER: We can move on 11 from this question. 12 MR. COLLIER: You're withdrawing 13 the question? 14 MR. HUNSBERGER: I'm going to 15 approach it in a different way, because we 16 don't have time -- 17 MR. COLLIER: I'm not being 18 critical. I am just saying your literal 19 question was "In your report do you cite." So 20 she gets to review her report. 21 MR. HUNSBERGER: We can move on and 22 ask the question a different way. 23 BY MR. HUNSBERGER: 24 Q. You testified earlier, Professor Rudin, 25 that you don't opine on anything that happened</p>

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<p style="text-align: right;">Page 82</p> <p>1 outside of way before any of these conducts; do you 2 recall that? 3 A. Right, I don't discuss anything that 4 happened way before any of these conducts. 5 Q. Do you offer any opinions that 6 advertisers or publishers were using 7 machine-learning models to optimize their ad 8 strategies prior to Google's conduct in this case? 9 MR. COLLIER: Object. Form. 10 A. The report doesn't contain any opinions 11 on what other entities were doing, if that's what 12 you are asking. 13 I know that machine learning has been 14 within the advertising world since its inception, 15 if that's what you are asking. 16 Q. My question is whether you offer any 17 opinions that prior to Google's conduct that you 18 analyze in your report advertisers or publishers 19 were using machine-learning models to optimize their 20 ad strategies? 21 A. So as I mentioned, machine learning and 22 advertising have been together since the inception 23 of advertising, so I -- you know, that's my answer. 24 Q. But do you offer that as an opinion in 25 your report?</p>	<p style="text-align: right;">Page 84</p> <p>1 them in my report. I explain many reasons why 2 Google's conducts make it very, very difficult to 3 optimize strategies. 4 Q. Did you review any documents produced in 5 this case stating that an advertiser used machine 6 learning to optimize its strategies? 7 A. There were many documents showing that 8 Google used machine learning to optimize its 9 strategies. 10 Q. My question was did you review any 11 documents produced in this case stating an 12 advertiser used machine learning to optimize its 13 strategy? 14 A. Possibly, but there are thousands and 15 thousands of documents. We can look through some 16 of them if you like. 17 Q. But you can't think of any right now; 18 correct? 19 A. There were documents I recall that might 20 be good answers to your questions, but I'm not sure 21 if I recall them well enough to want to declare 22 that as yes, I remember this. So I'm not really 23 sure how to answer the question. 24 Q. What is the earliest in time of the 25 Google conduct that you analyzed that you contend</p>
<p style="text-align: right;">Page 83</p> <p>1 MR. COLLIER: Object. Form. 2 Go ahead. 3 A. So my report covers specifically 4 conducts of Google that are mentioned in the 5 report. 6 Q. And you do not include any opinion that 7 publishers and advertisers were using 8 machine-learning models prior to Google's conduct; 9 correct? 10 MR. COLLIER: Object. Form. 11 A. Can you be more specific about what 12 you're looking for here? 13 Q. So you state that Google's supposed 14 auction manipulations that you analyze caused 15 customers to be unable to experiment to arrive at 16 optimal strategies. 17 And so what I'm asking for is did you 18 analyze the world without Google's conduct to 19 determine whether publishers or advertisers were 20 using machine-learning models prior to Google's 21 conduct to optimize their strategies. 22 A. Machine learning and advertising have 23 gone hand in hand since the beginning. So, you 24 know, machine learning is used in sort of -- for 25 many different purposes, and I've listed a lot of</p>	<p style="text-align: right;">Page 85</p> <p>1 interfered with the ability for buyers and sellers 2 to experiment to find optimal strategies? 3 A. Well, the notable Google program 4 launches, which would give you a better sense of 5 timeline, would include conduct starting from 2013. 6 Q. Did you offer any opinions that prior to 7 2013 advertisers and publishers in the ad tech 8 industries were using machine-learning models to 9 optimize their ad strategies? 10 MR. COLLIER: Objection. Asked and 11 answered. 12 Go ahead. 13 A. As I mentioned, machine learning is very 14 common in the advertising industry, so would I 15 assume lots of people would be using machine 16 learning in all different respects. 17 Q. I understand, Professor Rudin. Part of 18 the purpose of an expert deposition is understanding 19 what you are offering opinions on and what you're 20 not offering opinions on. And what I'm trying to 21 understand is do you offer opinions anywhere in your 22 report that prior to 2013 advertisers and publishers 23 in the ad tech industry were using machine-learning 24 models to optimize their ad strategies? 25 MR. COLLIER: Object. Form.</p>

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<p style="text-align: right;">Page 86</p> <p>1 Go ahead.</p> <p>2 A. My report doesn't address, like I said,</p> <p>3 things way before the conduct started. So that</p> <p>4 topic wouldn't be in my report.</p> <p>5 Q. In this case, did you attempt to build a</p> <p>6 machine-learning model applied to the ad tech</p> <p>7 industry?</p> <p>8 A. I have the hypothetical model in</p> <p>9 Section III.</p> <p>10 Q. Other than the hypothetical model in</p> <p>11 Section III, did you attempt to build a</p> <p>12 machine-learning model applied to the advertising</p> <p>13 technology industry in this case?</p> <p>14 A. What is your definition of "model"?</p> <p>15 Q. Did you attempt to build a model that</p> <p>16 could do the machine learning that you are</p> <p>17 describing in your report applied to the data in</p> <p>18 this case?</p> <p>19 MR. COLLIER: Object. Form.</p> <p>20 A. What data are you referring to?</p> <p>21 Q. So in this case there have been massive</p> <p>22 productions of detailed auction data. There's been</p> <p>23 log-level data, [REDACTED] impressions from Google,</p> <p>24 and similar large productions from third-party</p> <p>25 ad tech companies such as [REDACTED]</p>	<p style="text-align: right;">Page 88</p> <p>1 any machine-learning models from any data --</p> <p>2 log-level data to construct my opinions.</p> <p>3 Q. Did you estimate the amount of time and</p> <p>4 money that it would cost to build such a model?</p> <p>5 MR. COLLIER: Object. Form.</p> <p>6 A. No, because I had sufficient information</p> <p>7 to construct the opinions in my report.</p> <p>8 Q. Is it fair to say that at various points</p> <p>9 in your report you state or suggest that Google has</p> <p>10 an information advantage over individual advertisers</p> <p>11 and publishers that use Google's products?</p> <p>12 A. Yes.</p> <p>13 Q. For almost any advertiser or publishers</p> <p>14 that uses one of the ad tech intermediaries that we</p> <p>15 talked about, those intermediaries would also have</p> <p>16 an information advantage; correct?</p> <p>17 MR. COLLIER: Object. Form.</p> <p>18 A. Are you specifically discussing -- are</p> <p>19 you specifically discussing Google's</p> <p>20 intermediaries?</p> <p>21 Q. I'm talking about other intermediaries</p> <p>22 other than Google.</p> <p>23 So we talked about the fact that there</p> <p>24 are other ad exchanges, there are other buy-side</p> <p>25 tools.</p>
<p style="text-align: right;">Page 87</p> <p>1 [REDACTED] and several others.</p> <p>2 Did you attempt, in connection with this</p> <p>3 case, to build a machine-learning model that</p> <p>4 analyzed that data?</p> <p>5 A. I had sufficient information to</p> <p>6 construct my opinions in my report, so I didn't</p> <p>7 need to create machine-learning models from that</p> <p>8 data.</p> <p>9 Q. You are offering opinions in this case</p> <p>10 about what publishers and advertisers can and cannot</p> <p>11 do with their data when it comes to machine</p> <p>12 learning, and you have access to massive datasets in</p> <p>13 this case, and you decided not to build the model?</p> <p>14 MR. COLLIER: Object. Form.</p> <p>15 A. Is that a question?</p> <p>16 Q. Yes.</p> <p>17 A. It's not clear to me what model I would</p> <p>18 build that would give me any more information to</p> <p>19 make my opinions stronger than the ones that are</p> <p>20 already in this report.</p> <p>21 Q. Fair to say you did not use any of the</p> <p>22 log-level impression data produced in this case to</p> <p>23 build an empirical model; correct?</p> <p>24 A. I had sufficient information to</p> <p>25 construct my report, and so I did not need to build</p>	<p style="text-align: right;">Page 89</p> <p>1 It's true that for any of those buy-side</p> <p>2 tools or ad exchanges they will have an advantage</p> <p>3 over individual publishers and advertisers; correct?</p> <p>4 MR. COLLIER: Object. Form.</p> <p>5 A. I don't have information -- I don't</p> <p>6 opine on what other intermediaries' data access is.</p> <p>7 Other than Google.</p> <p>8 Q. Other than Google?</p> <p>9 A. Other than Google.</p> <p>10 Q. You have no opinions in this case on any</p> <p>11 third-party ad tech tools; is that correct?</p> <p>12 A. Not quite. So there's -- it's very</p> <p>13 clear that Google has more -- access to more data</p> <p>14 than anyone. Including, you know, others, just</p> <p>15 simply because of its massive scale and access to</p> <p>16 data.</p> <p>17 Q. If you didn't analyze third-party</p> <p>18 ad tech tools, how can you offer the opinion that</p> <p>19 Google has more access to data than anyone?</p> <p>20 A. Because I understand from all of the</p> <p>21 documents that I have read that Google's scale is</p> <p>22 absolutely enormous.</p> <p>23 Let's go to the data section in the</p> <p>24 report and just talk about the data.</p> <p>25 Q. So my question is whether you did any</p>

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<p>1 comparative analysis.</p> <p>2 Did you compare the amount of data that</p> <p>3 Google has --</p> <p>4 MR. COLLIER: Counsel, I'm not sure</p> <p>5 she was done answering.</p> <p>6 Were you done answering?</p> <p>7 THE WITNESS: Not yet.</p> <p>8 MR. COLLIER: I would ask that you</p> <p>9 let her finish.</p> <p>10 MR. HUNSBERGER: Counsel, I want to</p> <p>11 make sure we're not filibustering and wasting</p> <p>12 time.</p> <p>13 BY MR. HUNSBERGER:</p> <p>14 Q. But if you have more to say, I certainly</p> <p>15 did not mean to cut you off.</p> <p>16 A. I'm not filibustering. I am doing my</p> <p>17 best to answer your questions.</p> <p>18 So if we look at the data section --</p> <p>19 Q. Which paragraph?</p> <p>20 A. I'm looking at Section IV. And it has,</p> <p>21 yo know, the list of data from past auctions.</p> <p>22 Well, Google has conducted an enormous amount of</p> <p>23 auctions, internal and AdX auctions. It has data</p> <p>24 from third-party cookies. It's an enormous amount</p> <p>25 of data. And data from the O&O properties, which</p>	<p>1 to have more and better information than you;</p> <p>2 correct?</p> <p>3 MR. COLLIER: Object. Form.</p> <p>4 A. It depends. With real estate it's not</p> <p>5 really clear anymore that that's true.</p> <p>6 Q. But you wouldn't hire a real estate</p> <p>7 agent unless that real estate agent had more and</p> <p>8 better information than you; correct?</p> <p>9 A. I think you have to hire a real estate</p> <p>10 agent, don't you? I'm not really sure. I'm not an</p> <p>11 expert in real estate.</p> <p>12 Q. Based on the materials you've reviewed</p> <p>13 in this case and your understanding of the ad tech</p> <p>14 industry, is it your understanding that advertisers</p> <p>15 expect Google Ads has more information than the</p> <p>16 individual advertiser?</p> <p>17 MR. COLLIER: Object. Form.</p> <p>18 A. I expect Google Ads has more information</p> <p>19 than the individual advertiser.</p> <p>20 Q. Is your understanding that advertisers</p> <p>21 understand that to be the case too?</p> <p>22 MR. COLLIER: Object. Form.</p> <p>23 A. I believe advertisers understand that to</p> <p>24 be the case.</p> <p>25 Q. So advertisers come to Google Ads to</p>
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<p>1 is also an enormous amount of data that no one else</p> <p>2 has access to that level of data.</p> <p>3 Sorry, go ahead with your question.</p> <p>4 Q. Thank you, Professor.</p> <p>5 So my question is in reaching the</p> <p>6 conclusion that you just said that no one has access</p> <p>7 to that amount of data, did you do a comparative</p> <p>8 analysis of the amount of data that Google has</p> <p>9 compared to the amount of data that other companies</p> <p>10 have in the ad tech industry?</p> <p>11 A. I've seen many documents that state that</p> <p>12 Google has much, much more data than anyone else.</p> <p>13 Q. But you did not do any empirical</p> <p>14 analysis of the amount of data that Google has</p> <p>15 compared to other companies in the ad tech industry;</p> <p>16 correct?</p> <p>17 A. Empirical analysis meaning I would</p> <p>18 actually have to see that data and have giant</p> <p>19 tables of what the data is?</p> <p>20 Q. Correct.</p> <p>21 A. That's not something that I did.</p> <p>22 Q. Taking a step back, in other contexts</p> <p>23 outside of ad tech, if you use an intermediary --</p> <p>24 say, for example, if you use a real estate agent to</p> <p>25 help you buy a home -- you expect that intermediary</p>	<p>1 help them achieve their goals that we talked about</p> <p>2 earlier, and advertisers expect Google Ads to use</p> <p>3 the information that Google Ads has to achieve the</p> <p>4 advertisers' goals; correct?</p> <p>5 A. I'm not an advertiser, and I can't tell</p> <p>6 you what advertisers expect.</p> <p>7 Q. Did you interview any advertisers in</p> <p>8 connection with this case to form your opinions?</p> <p>9 A. No.</p> <p>10 Q. Did you review documents produced by any</p> <p>11 advertisers in this case to form your opinions?</p> <p>12 A. I reviewed many Google internal</p> <p>13 documents. Some of them may have had things from</p> <p>14 advertisers in them.</p> <p>15 Q. Did you review any documents produced by</p> <p>16 the advertisers themselves, not produced by Google?</p> <p>17 MR. COLLIER: Object. Form.</p> <p>18 A. I did not review information outside of</p> <p>19 the case produced by advertisers, no.</p> <p>20 Q. Did you review any produced materials in</p> <p>21 this case by advertisers?</p> <p>22 MR. COLLIER: Object. Form.</p> <p>23 You can answer.</p> <p>24 A. I don't recall any.</p> <p>25 Q. Is it your opinion that Google Ads has</p>

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<p style="text-align: right;">Page 94</p> <p>1 an information advantage over individual 2 advertisers? 3 MR. COLLIER: Object. Form. 4 A. Yes, Google Ads has an information 5 advantage over individual advertisers. 6 Q. If Google Ads uses that information to 7 win more impressions for the advertiser, you would 8 expect the advertiser to not try to stop that from 9 happening; correct? 10 MR. COLLIER: Object. Form. 11 A. That one requires a level of context 12 that -- you know, the question is how much did they 13 pay for the pay? Would they have wanted to pay 14 less? 15 There's a level of context there that I 16 don't think that question has in it, so I can't 17 really answer it. 18 MR. HUNSBERGER: Counsel and 19 Professor, I'm at a good breaking point or we 20 can keep going. It's up to you. It's been 21 about an hour since we went back on the 22 record. 23 THE WITNESS: I've run out. 24 MR. COLLIER: That's fair. 25 Do you want to break for lunch,</p>	<p style="text-align: right;">Page 96</p> <p>1 Q. If we look at paragraph 51 of your 2 report. 3 A. Okay. 4 Q. It says, "I am going to start building 5 my ML Abstracted Auction on a set of postulates or 6 givens." 7 That's the "givens" I referred to in the 8 question. 9 A. Oh, thank you. 10 Q. So I can repeat the question, if that 11 would be helpful. 12 A. What page are you on again? 13 Q. Paragraph 51, page 19. 14 A. Sure. 15 Q. Here in paragraph 51 you note that you 16 have a set of givens, and you adjust them to 17 determine whether it would be possible to construct 18 effective machine-learning models; is that correct? 19 A. Yes. It says, "I am going to start 20 building my ML Abstracted Auction on a set of 21 postulates" -- I'm just reading paragraph 51 on 22 page 19. I'm sorry. 23 Q. One given in your report is that buyers 24 and sellers will use machine-learning models; 25 correct?</p>
<p style="text-align: right;">Page 95</p> <p>1 Counsel? We're kind of at your -- we will do 2 whatever. Do you want to break for lunch? 3 MR. HUNSBERGER: Why don't we go 4 off the record. 5 THE VIDEOGRAPHER: Going off the 6 record. The time is 11:45 a.m. 7 (Recess taken.) 8 THE VIDEOGRAPHER: Going back on 9 record. The time is 11:58 a.m. 10 BY MR. HUNSBERGER: 11 Q. Professor Rudin, welcome back. 12 Talking again about some of the 13 abstraction models that you discuss in your report, 14 is it fair to say you designed machine-learning 15 abstracted options to illustrate how various Google 16 optimizations operate? 17 MR. COLLIER: Object. Form. 18 A. Yes. 19 Q. You also note that you have a set of 20 givens and adjust those givens to determine whether 21 it's possible to construct effective 22 machine-learning models; is that correct? 23 A. I don't understand the question because 24 it doesn't say anything about givens, I don't 25 think, in the report anywhere.</p>	<p style="text-align: right;">Page 97</p> <p>1 A. Correct. 2 Q. And earlier you defined buyers in the 3 ad tech industry as buy-side tools or advertiser, 4 depending on the context; correct? 5 A. Either earlier or later, yes. 6 Q. Earlier in your testimony -- 7 A. Oh, earlier today. Okay. 8 Q. -- today you defined sellers as 9 publishers in the ad tech industry; correct? 10 A. Correct. 11 Q. Did you interview any buyers in the 12 ad tech industry about their use of machine learning 13 models? 14 A. No. I had sufficient information to 15 construct my report without interviewing additional 16 people. 17 Q. Did you analyze the percentage of buyers 18 in the ad tech industry that utilized 19 machine-learning models? 20 A. The word use is confusing, because even 21 if you don't develop the machine-learning algorithm 22 yourself, you may end up using one in another 23 context. So it's hard to answer that question 24 exactly. 25 Q. Could you explain what you mean by that?</p>

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<p style="text-align: right;">Page 98</p> <p>1 MR. COLLIER: Objection. Form.</p> <p>2 Go ahead.</p> <p>3 A. You know, if you're an advertiser and</p> <p>4 you choose not to use machine learning to bid,</p> <p>5 perhaps others will be using machine learning to</p> <p>6 bid either for you or, you know, against you or</p> <p>7 something like that. So you might have machine</p> <p>8 learning used even by those who don't develop</p> <p>9 machine-learning algorithms themselves.</p> <p>10 Q. Did you evaluate the percentage of</p> <p>11 buyers in the ad tech industry that develop</p> <p>12 machine-learning models?</p> <p>13 A. I would refer to some of the other</p> <p>14 reports for kind of, like, the overall view of the</p> <p>15 industry since I'm not really an expert on that --</p> <p>16 you know, who does what in the industry.</p> <p>17 Q. To your knowledge, did any of the other</p> <p>18 plaintiffs' experts in this case evaluate the</p> <p>19 percentage of buyers in the ad tech industry that</p> <p>20 developed machine-learning models?</p> <p>21 A. There are thousands and thousands of</p> <p>22 pages in those reports, and I don't remember all of</p> <p>23 them, so I'm not really sure.</p> <p>24 Q. Did you interview any sellers in the</p> <p>25 ad tech industry about their use of machine-learning</p>	<p style="text-align: right;">Page 100</p> <p>1 on -- in your abstracted auction you say, "For each</p> <p>2 auction, both the buyers and sellers try to estimate</p> <p>3 the value of the item being auctioned."</p> <p>4 Do you see that?</p> <p>5 A. Yes. Here it says "the value of the</p> <p>6 item," whereas you just said "value," so I got a</p> <p>7 little confused.</p> <p>8 Q. So do you agree that machine learning is</p> <p>9 not the only method to estimate the value of the</p> <p>10 item?</p> <p>11 MR. COLLIER: Objection. Form.</p> <p>12 A. You could use very simple statistics to</p> <p>13 estimate value if you like. I don't know if that</p> <p>14 would fall under machine learning. Some of it</p> <p>15 does.</p> <p>16 Q. Later in your report you continue to</p> <p>17 describe your methodology in creating this</p> <p>18 abstraction model, and in your model you analyze how</p> <p>19 these models apply to Google's optimizations that</p> <p>20 you analyzed in the case; correct?</p> <p>21 A. I tried to.</p> <p>22 Q. If we turn just two pages past where you</p> <p>23 currently are, to paragraphs 58 and 59 of your</p> <p>24 report.</p> <p>25 A. Okay.</p>
<p style="text-align: right;">Page 99</p> <p>1 models in the industry?</p> <p>2 A. I had sufficient information to</p> <p>3 construct my report, so I didn't interview any, you</p> <p>4 know, additional people, including sellers.</p> <p>5 Q. Did you analyze the percentage of</p> <p>6 sellers in the ad tech industry that have</p> <p>7 machine-learning models?</p> <p>8 A. So, again, since I am not an expert in</p> <p>9 who does what in this industry, I would refer to</p> <p>10 others, other reports, for that information.</p> <p>11 Q. But you agree that machine learning is</p> <p>12 not the only method to estimate value in the ad tech</p> <p>13 industry; correct?</p> <p>14 MR. COLLIER: Objection. Form.</p> <p>15 A. I'm not actually sure how you would</p> <p>16 estimate -- what was the question again?</p> <p>17 Q. You agree that machine learning is not</p> <p>18 the only method to estimate value; correct?</p> <p>19 MR. COLLIER: Objection. Form.</p> <p>20 A. To estimate value? I'm not sure what</p> <p>21 "to estimate value" means. But estimation and</p> <p>22 prediction in general, machine learning is a very</p> <p>23 powerful tool for that.</p> <p>24 Q. So if we look at paragraph 52 of your</p> <p>25 report -- I think it's the same page that you're</p>	<p style="text-align: right;">Page 101</p> <p>1 Q. In paragraph 58 do you see where it says</p> <p>2 "Variables that the model would use for bids</p> <p>3 include"?</p> <p>4 A. Yes.</p> <p>5 Q. And then in paragraph 59 you write</p> <p>6 "Output from their valuation model."</p> <p>7 Do you see that, Professor?</p> <p>8 A. Yes.</p> <p>9 Q. Then you have subparts (a), (b) and (c)</p> <p>10 of that paragraph. At the end of subpart (c) you</p> <p>11 write, "and so on."</p> <p>12 Do you see that?</p> <p>13 A. Yes.</p> <p>14 Q. What are variables would an auction</p> <p>15 participant need to know for their model?</p> <p>16 A. I think auction participants would want</p> <p>17 to know the full context, as much as they could,</p> <p>18 that would help them value the item. That could</p> <p>19 include any background about the item itself, about</p> <p>20 the bidders and their benefit from getting the</p> <p>21 item, the -- let's see, what else. There's ton of</p> <p>22 stuff here.</p> <p>23 So I list actually a lot of things on</p> <p>24 page 20 and 21 that bidders might want to know,</p> <p>25 including how rare the item is, the price of</p>

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<p style="text-align: right;">Page 102</p> <p>1 similar items from a similar period, whether</p> <p>2 there's a collector who wants -- I could go on and</p> <p>3 on all day about different things people would want</p> <p>4 to know in order to create a valuation for an item.</p> <p>5 Q. So you just discussed a number of things</p> <p>6 that auction participants would want to know?</p> <p>7 A. That would help them construct their</p> <p>8 valuation model.</p> <p>9 Q. Do you have an opinion on what they need</p> <p>10 to know in order to construct their valuation model?</p> <p>11 MR. COLLIER: Objection. Form.</p> <p>12 A. I think it depends on the context.</p> <p>13 That's very context dependent.</p> <p>14 Q. Building on our discussion about your</p> <p>15 abstracted auction, if I understand from our</p> <p>16 discussion a couple minutes ago, the buyer and</p> <p>17 seller are each trying to estimate the true value of</p> <p>18 the auction item; is that correct?</p> <p>19 A. They're each trying to create a</p> <p>20 valuation of the auction item. They have different</p> <p>21 motivations in what they're -- they're doing.</p> <p>22 Right? One is trying to buy and the other is</p> <p>23 trying to sell. But I think that's clear.</p> <p>24 Q. When you apply your abstracted auction</p> <p>25 to the facts of this case, an auction item is an ad</p>	<p style="text-align: right;">Page 104</p> <p>1 me see if I can find it.</p> <p>2 So I listed several subsections listing</p> <p>3 data that's useful for prediction in Section IV of</p> <p>4 the report starting on page 31, including data from</p> <p>5 past auctions, including bid data from internal</p> <p>6 auctions and bid data from AdX auctions, data from</p> <p>7 third-party cookies -- sorry, in Section B,</p> <p>8 detailed user data, including data from third-party</p> <p>9 cookies. And data from Google's O&O properties.</p> <p>10 So that's some examples of data that</p> <p>11 would be useful in ad tech options.</p> <p>12 Q. In that section of your report that you</p> <p>13 refer to you're describing data that Google has;</p> <p>14 correct?</p> <p>15 A. Yes.</p> <p>16 Q. And you're not describing data that a</p> <p>17 buyer or seller would use to build its valuation for</p> <p>18 the ad impression; correct?</p> <p>19 MR. COLLIER: Objection. Form.</p> <p>20 A. Well, if they had access to all of that</p> <p>21 data I think they would probably want to use that</p> <p>22 data.</p> <p>23 Q. But you're not describing data that they</p> <p>24 do use; correct?</p> <p>25 A. They have some data. Some of this data</p>
<p style="text-align: right;">Page 103</p> <p>1 impression; is that fair?</p> <p>2 A. Not in the abstracted auction. The</p> <p>3 abstracted auction is completely general. But</p> <p>4 later in the report, yeah.</p> <p>5 Q. Apologies if I wasn't clear. I was</p> <p>6 asking, when you apply your abstracted auction to</p> <p>7 the facts of the ad tech industry in this case, an</p> <p>8 auction item is the ad impression; is that correct?</p> <p>9 A. Yes. Later on in the report, yes.</p> <p>10 Q. And in your opinion, what types of</p> <p>11 factors would a buyer consider in estimating the</p> <p>12 valuation?</p> <p>13 A. This is very heavily context dependent.</p> <p>14 So I've given an example in the abstracted auction</p> <p>15 section, page 20 and 21.</p> <p>16 Q. As you point out, you provided examples</p> <p>17 of factors that a buyer might consider in your</p> <p>18 abstracted auction applied in the art auction</p> <p>19 context?</p> <p>20 A. Yes.</p> <p>21 Q. I am wondering if you have a similar</p> <p>22 list of factors that an auction participant might</p> <p>23 consider in the ad tech auction context.</p> <p>24 A. I think we -- I think we listed -- yes,</p> <p>25 I think we listed some of that in this report. Let</p>	<p style="text-align: right;">Page 105</p> <p>1 they have. But not all of it.</p> <p>2 Q. Did you interview any advertisers to</p> <p>3 reach your conclusion that advertisers would want to</p> <p>4 use this data?</p> <p>5 A. This kind of data is very useful for</p> <p>6 determining valuations and bids. So I would be</p> <p>7 absolutely shocked if advertisers wouldn't want to</p> <p>8 use this data.</p> <p>9 Q. But you did not have any conversations</p> <p>10 with advertisers to reach your conclusion that</p> <p>11 advertisers would want to use this data; correct?</p> <p>12 A. Again, this data is very -- would be</p> <p>13 very valuable for constructing bids and valuations,</p> <p>14 so I don't need to talk to any advertisers directly</p> <p>15 to determine that this data would be valuable to</p> <p>16 determine that.</p> <p>17 Q. So you assume it would be valuable based</p> <p>18 on your understanding of the industry?</p> <p>19 A. Based on my understanding of the</p> <p>20 industry as well as my understanding of what</p> <p>21 Google's actually using to do its own predictions.</p> <p>22 Q. But there's a difference between what</p> <p>23 Google is doing to make its predictions as an</p> <p>24 ad tech tool versus what publishers or advertisers</p> <p>25 are doing to make their predictions; correct?</p>

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<p style="text-align: right;">Page 106</p> <p>1 A. Google has much more data than even</p> <p>2 advertisers or publishers, so Google is doing</p> <p>3 something different than advertisers and</p> <p>4 publishers.</p> <p>5 Q. And you have not heard from any</p> <p>6 advertisers or publishers in connection with this</p> <p>7 case that they want all that data to do their</p> <p>8 predictions; correct?</p> <p>9 MR. COLLIER: Object. Form.</p> <p>10 A. I have read in various Google internal</p> <p>11 documents that, for example, publishers really want</p> <p>12 access to more data. Or that they were hurt when</p> <p>13 data was removed from their -- from being available</p> <p>14 to them.</p> <p>15 Q. Those Google internal documents are the</p> <p>16 only source that helped you reach that conclusion?</p> <p>17 MR. COLLIER: Objection. Form.</p> <p>18 A. Which conclusion?</p> <p>19 Q. That publishers want access to more</p> <p>20 data.</p> <p>21 A. Everybody wants access to more data.</p> <p>22 Data is valuable.</p> <p>23 Q. That's your assumption; correct?</p> <p>24 A. That's based on my knowledge, my 20</p> <p>25 years of knowledge working in this field.</p>	<p style="text-align: right;">Page 108</p> <p>1 A. I've cited more than Google documents in</p> <p>2 my report, a lot of it attesting to the value of</p> <p>3 data. And even data within the advertising</p> <p>4 industry.</p> <p>5 Q. What other evidence other than Google</p> <p>6 documents do you cite to support your conclusion</p> <p>7 that sellers want access to more data?</p> <p>8 A. Okay. Let's go through the report again</p> <p>9 and try to find all the places I've cited where --</p> <p>10 so you want documents that I've cited on the value</p> <p>11 of data outside of Google internal documents;</p> <p>12 correct?</p> <p>13 Q. No, that's not correct.</p> <p>14 A. Okay, I'm sorry.</p> <p>15 Q. I will just ask the question in a</p> <p>16 different way.</p> <p>17 What evidence did you rely on in forming</p> <p>18 your opinions to reach the conclusion that</p> <p>19 publishers want access to more data?</p> <p>20 A. Other than Google internal documents?</p> <p>21 Q. Correct.</p> <p>22 A. So I'm not allowed to use Google</p> <p>23 internal documents.</p> <p>24 Am I allowed to use Google internal</p> <p>25 expert reports?</p>
<p style="text-align: right;">Page 107</p> <p>1 Q. Do you have knowledge --</p> <p>2 A. Data's the new oil.</p> <p>3 MR. COLLIER: Let him ask his</p> <p>4 complete question.</p> <p>5 Q. I don't mind an occasional injection of</p> <p>6 humor.</p> <p>7 So do you have knowledge applied to the</p> <p>8 publishers and advertisers we are talking about in</p> <p>9 this case that they want access to the data that you</p> <p>10 are referring to?</p> <p>11 MR. COLLIER: Object to form.</p> <p>12 A. I've seen Google internal documents that</p> <p>13 show that -- that states specifically that sellers</p> <p>14 want access to more data.</p> <p>15 Q. Do you have any other evidence in this</p> <p>16 case other than Google, in terms of documents to</p> <p>17 support your conclusion that sellers want access to</p> <p>18 more data?</p> <p>19 A. I believe everybody wants access to more</p> <p>20 data, because the more data you have, the better</p> <p>21 you can estimate, predict, act.</p> <p>22 Q. You believe that based on your</p> <p>23 experience, but your only cited evidence in your</p> <p>24 report is Google documents; is that correct?</p> <p>25 MR. COLLIER: Objection. Form.</p>	<p style="text-align: right;">Page 109</p> <p>1 Q. You're, in forming your opinions in this</p> <p>2 case, allowed to use the materials in the record.</p> <p>3 It's just a simple factual question.</p> <p>4 Other than internal Google documents,</p> <p>5 what other evidence did you rely on to form</p> <p>6 your conclusion that publishers want access to more</p> <p>7 data?</p> <p>8 A. So we have cited a number of academic</p> <p>9 papers that are published and are freely available</p> <p>10 that show that machine-learning models are used in</p> <p>11 the ad tech industry for different purposes. So</p> <p>12 the value of that data is clear in those academic</p> <p>13 papers. And of course we used a lot of internal</p> <p>14 Google documents and expert reports.</p> <p>15 Q. Looking at paragraph 61 of your report,</p> <p>16 page 21. You state that "one buyer may pay more to</p> <p>17 complete a collection with the 'Last piece in</p> <p>18 Series A by Frida Kahlo,' which would increase the</p> <p>19 value of the collection as a whole."</p> <p>20 Do you see that?</p> <p>21 A. Yes.</p> <p>22 Q. That suggests that each potential buyer</p> <p>23 might have a different value for a particular item</p> <p>24 in an auction; correct?</p> <p>25 A. Correct.</p>

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<p style="text-align: right;">Page 110</p> <p>1 Q. So applying that to the ad tech 2 industry, each potential buyer might have a 3 different value for the ad impression; correct? 4 A. Correct. 5 Q. Is it fair to say that impression values 6 are a combination of information known to the buyer 7 and information unknown to the buyer? 8 A. Yes. 9 Q. What proportion of the value of a 10 typical impression is known versus unknown? 11 MR. COLLIER: Objection. Form. 12 A. There's no way I can answer that 13 question because it's auction dependent. There 14 could be some auctions where the answer is 100 and 15 some where it's zero. 16 Q. As we talked about earlier, Google 17 produced log-level bid and auction data for billions 18 of impressions in connection with this litigation. 19 Did you analyze that data to determine 20 what information is known versus unknown to 21 advertisers? 22 A. First, I had sufficient information to 23 construct my report, so I wouldn't have needed to 24 do that kind of analysis. But even if I had, I 25 would not have had enough information to determine</p>	<p style="text-align: right;">Page 112</p> <p>1 A. Well, it depends -- again, this is very 2 context dependent, so it depends on the auction. 3 And we went through a bunch of examples earlier, 4 where -- you know, in the abstracted case, we -- I 5 listed -- I listed information about an art 6 auction. We talked earlier about useful 7 information in -- that the seller might want to use 8 earlier as well, which is in Section IV. I think 9 it's in other sections as well. 10 Q. In the ad tech industry what information 11 would sellers use to estimate the value of an ad 12 impression? 13 MR. COLLIER: Objection. Form. 14 A. So we've listed a number of data sources 15 that sellers could use to estimate values and set 16 floor prices, if that's what you're asking. 17 Do you want to go back to Section IV? 18 Q. I was just asking in general terms, 19 based on your expertise and the report you submitted 20 in this case, what information sellers use to 21 estimate the value of an ad impression. 22 MR. COLLIER: Objection. Form. 23 A. Well, again, it's very dependent on the 24 information that the sellers have available to them 25 and what the auction actually is. So that's why I</p>
<p style="text-align: right;">Page 111</p> <p>1 that. 2 Q. Turning to the seller in your abstracted 3 auction, is it fair to say that your seller in the 4 abstracted auction not only knows the potential 5 buyers for any given impression but also estimates 6 the value for each such buyer? 7 A. I'm sorry. Are you working in the 8 abstracted auction? 9 Q. Correct. I'm looking at paragraph 61. 10 A. Okay. This is an abstract case, but in 11 general a seller may have some idea who the 12 potential buyers are or who the potential set of 13 buyers that might have the highest bids are for a 14 given auction. 15 Q. As you write in paragraph 61, "the 16 seller wants to estimate the value of the auction 17 item as well"; correct? 18 A. Where are you looking? 19 Q. The first sentence of paragraph 61. 20 A. 61? Yeah. So in paragraph 61 it says, 21 "In my ML Abstracted Auction, the seller wants to 22 estimate the value of the auction item as well. 23 They need to estimate the value for each buyer." 24 Q. What information would sellers use to 25 estimate the value of the auction item?</p>	<p style="text-align: right;">Page 113</p> <p>1 listed all of these things in Section IV of my 2 report. The sellers wouldn't have access to all 3 that information, but they would use as much as 4 they could, as much as they had. 5 Q. You understand that many display ad 6 campaigns are targeted to particular users? 7 A. What do you refer to as a "user" in this 8 case? 9 Q. For example, the user of a web page to 10 whom a display advertisement is shown. 11 A. Okay. And you're asking whether ads are 12 tailored to individual users? 13 Q. Whether based on your understanding of 14 the ad tech industry display ad campaigns are 15 targeted to particular users. 16 MR. COLLIER: Objection. Form. 17 A. I think it depends on the display ad 18 campaign, but I think there are campaigns that 19 would target users that have a specific set of 20 properties associated with them. 21 In terms of particular users, I don't 22 know if they know the user by name, but I think 23 certainly there are ad campaigns that are targeted 24 towards particular types of users. 25 Q. Because the properties of those users</p>

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<p style="text-align: right;">Page 114</p> <p>1 might have a high value to the advertiser; correct?</p> <p>2 MR. COLLIER: Objection. Form.</p> <p>3 A. Correct.</p> <p>4 Q. Is it your understanding for those users</p> <p>5 the auctions to serve advertisements to those users</p> <p>6 with particular properties might be more competitive</p> <p>7 auctions?</p> <p>8 MR. COLLIER: Objection. Form.</p> <p>9 A. Not necessarily. Again, we're missing a</p> <p>10 lot of context here. So it could be that there's</p> <p>11 only one buyer right now who would value this</p> <p>12 particular user highly, and so it might not be an</p> <p>13 auction where there are multiple high bids. I'm</p> <p>14 not really sure. It really depends on the actual</p> <p>15 context.</p> <p>16 Q. Professor, moving on a little bit from</p> <p>17 your abstracted model, earlier today we discussed</p> <p>18 that one goal of a seller in an auction is to</p> <p>19 maximize their revenue.</p> <p>20 Do you agree with that?</p> <p>21 A. One goal among possibly many.</p> <p>22 Q. And to maximize their revenues in a</p> <p>23 second price auction, sellers need to set the floor</p> <p>24 price as close as possible to what the buyer who</p> <p>25 values the auction item most is willing to pay?</p>	<p style="text-align: right;">Page 116</p> <p>1 A. In general -- in general, sellers want</p> <p>2 to set the floor price as close as possible to what</p> <p>3 the buyer who values the auction item most is</p> <p>4 willing to pay.</p> <p>5 Q. What is your understanding of what a</p> <p>6 floor price is?</p> <p>7 A. It's the minimum amount that the seller</p> <p>8 is willing to accept.</p> <p>9 I'm sorry, I should have looked that up.</p> <p>10 Right?</p> <p>11 Q. Again, in your abstracted model</p> <p>12 discussed in your report, to determine the optimal</p> <p>13 floor price to maximize revenue you indicate that a</p> <p>14 seller would use machine learning to estimate the</p> <p>15 value of the auction item; is that right?</p> <p>16 A. Sellers would benefit generally from</p> <p>17 using machine learning to set their floor prices.</p> <p>18 Q. And in your abstracted model in</p> <p>19 paragraph 63 you don't specify whether the</p> <p>20 abstracted model is in a first-price or second-price</p> <p>21 auction; is that correct?</p> <p>22 A. I believe I discussed both. It's</p> <p>23 somewhere in this. Somewhere in this chapter.</p> <p>24 Q. Do you understand the terms "floor</p> <p>25 price" and "reserve price" to refer to the same</p>
<p style="text-align: right;">Page 115</p> <p>1 A. I'm sorry. Can you tell me the context</p> <p>2 in which you're asking this?</p> <p>3 You're in the abstracted auction?</p> <p>4 Q. You discussed this issue in the</p> <p>5 abstracted auction, but then you obviously apply</p> <p>6 your abstracted auction to the ad tech industry.</p> <p>7 A. So we go back to the abstracted auction</p> <p>8 then, and you're asking whether if in the</p> <p>9 abstracted auction the seller -- I'm sorry, could</p> <p>10 you ask it again?</p> <p>11 Q. So I'm looking here at paragraph 62 of</p> <p>12 your report.</p> <p>13 A. Okay.</p> <p>14 Q. The second -- actually, the third</p> <p>15 sentence.</p> <p>16 A. Okay.</p> <p>17 Q. My question was: To maximize their</p> <p>18 revenues in a second price auction, sellers need to</p> <p>19 set the floor price as close as possible to what the</p> <p>20 buyer who values the auction item most is willing to</p> <p>21 pay; correct?</p> <p>22 A. Yes, that's true in the abstracted</p> <p>23 auction. That's exactly what that says, yes.</p> <p>24 Q. And that's also true for second price</p> <p>25 auctions in the ad tech industry; correct?</p>	<p style="text-align: right;">Page 117</p> <p>1 thing?</p> <p>2 MR. COLLIER: Objection. Form.</p> <p>3 A. Yes.</p> <p>4 Q. Is it fair to say that the purpose of</p> <p>5 the machine-learning model as discussed in your</p> <p>6 abstract model is to generalize the optimal point</p> <p>7 that is as close as possible to the highest amount</p> <p>8 that a buyer will pay?</p> <p>9 A. To generalize the -- where are you</p> <p>10 reading from?</p> <p>11 Q. I'm not reading.</p> <p>12 A. I'm sorry. Could you -- the word</p> <p>13 "generalize" has a specific meaning to me, and I'm</p> <p>14 not sure that's your meaning.</p> <p>15 Q. The purpose of the machine-learning</p> <p>16 model as discussed in your abstraction is to</p> <p>17 generate the optimal point that is as close as</p> <p>18 possible to the highest amount that a buyer will</p> <p>19 pay?</p> <p>20 A. It's to help them generate that, yes.</p> <p>21 To help them generate that.</p> <p>22 Q. In your hypothetical model another</p> <p>23 feature is the sellers know who the buyers are; is</p> <p>24 that correct?</p> <p>25 A. They should know some of the buyers,</p>

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<p style="text-align: right;">Page 118</p> <p>1 yes. That would help them a lot, if they knew</p> <p>2 information about the buyers.</p> <p>3 Q. And the sellers have data from past</p> <p>4 auctions; correct?</p> <p>5 A. In the abstracted auction, yes, they do</p> <p>6 have data from past auctions.</p> <p>7 Q. To clarify, how many past auctions were</p> <p>8 you contemplating in your abstracted model?</p> <p>9 MR. COLLIER: Objection. Form.</p> <p>10 A. It could be any number. It could be</p> <p>11 ranging from one to -- go up as high as you like.</p> <p>12 Q. Would that be limited just to auctions</p> <p>13 that the seller has participated in?</p> <p>14 A. The more auction information they have,</p> <p>15 the better for them.</p> <p>16 Q. In your abstracted model here, was the</p> <p>17 information that sellers had access to limited to</p> <p>18 auctions that they participated in, or did they also</p> <p>19 have access to information from auctions that they</p> <p>20 did not participate in?</p> <p>21 A. You can take it either way. And if they</p> <p>22 had data from auctions they did not participate in,</p> <p>23 they would leverage that information and be able to</p> <p>24 make better decisions.</p> <p>25 THE WITNESS: I think it's getting</p>	<p style="text-align: right;">Page 120</p> <p>1 Q. But as contemplated in your abstracted</p> <p>2 model, would they also have data on every buyer who</p> <p>3 has participated in the auction?</p> <p>4 A. You could take that either way.</p> <p>5 MR. HUNSBERGER: Okay. We can take</p> <p>6 break.</p> <p>7 THE VIDEOGRAPHER: Going off the</p> <p>8 record. The time is 12:39 p.m.</p> <p>9 (Luncheon recess: 12:39 p.m.)</p> <p>10</p> <p>11</p> <p>12</p> <p>13</p> <p>14</p> <p>15</p> <p>16</p> <p>17</p> <p>18</p> <p>19</p> <p>20</p> <p>21</p> <p>22</p> <p>23</p> <p>24</p> <p>25</p>
<p style="text-align: right;">Page 119</p> <p>1 to be time for us to take a break perhaps?</p> <p>2 How close are we? For lunch. How close are</p> <p>3 we?</p> <p>4 MR. HUNSBERGER: I can do a couple</p> <p>5 more questions and then we can break.</p> <p>6 THE WITNESS: Okay. That sounds</p> <p>7 good.</p> <p>8 MR. COLLIER: And we're not trying</p> <p>9 to interrupt a module.</p> <p>10 THE WITNESS: I'm sorry. I'm just</p> <p>11 hearing my stomach.</p> <p>12 MR. HUNSBERGER: I won't go long.</p> <p>13 I want to be mindful and professional and</p> <p>14 courteous.</p> <p>15 THE WITNESS: You're fine, don't</p> <p>16 worry.</p> <p>17 BY MR. HUNSBERGER:</p> <p>18 Q. In your abstracted model, would the</p> <p>19 seller also have data from every buyer who has ever</p> <p>20 participated in an auction?</p> <p>21 A. The seller could -- the more information</p> <p>22 the seller has about bids from auctions they</p> <p>23 participated in or auctions that others have</p> <p>24 participated in, the more they could use that data</p> <p>25 to make better decisions.</p>	<p style="text-align: right;">Page 121</p> <p>1 AFTERNOON SESSION</p> <p>2 (Time noted: 1:48 p.m.)</p> <p>3 THE VIDEOGRAPHER: Going back on</p> <p>4 the record. The time is 1:48 p.m.</p> <p>5 ---</p> <p>6 CYNTHIA RUDIN, resumed and testified</p> <p>7 further as follows:</p> <p>8 CONTINUED EXAMINATION</p> <p>9 BY MR. HUNSBERGER:</p> <p>10 Q. Professor Rudin, welcome back. I'm glad</p> <p>11 we've been able to sort out these technical</p> <p>12 difficulties.</p> <p>13 Before we move on to some new topics, I</p> <p>14 would like to just circle back to two points we</p> <p>15 discussed this morning.</p> <p>16 One relates to your opinion in paragraph</p> <p>17 25 of your report on page 9. Here and elsewhere in</p> <p>18 your report you refer to what you describe as</p> <p>19 "optimal strategies."</p> <p>20 How do you define optimal strategies for</p> <p>21 purposes of your report?</p> <p>22 A. So the optimality of a strategy would</p> <p>23 need to be defined by the person who wants to</p> <p>24 create it. So different publishers might have</p> <p>25 different optimal strategies, advertisers might</p>

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<p style="text-align: right;">Page 122</p> <p>1 have different optimal strategies, and they might 2 define optimality differently. 3 Q. What might drive those different 4 definitions for different publishers and 5 advertisers? 6 A. There could be a lot of things that 7 define optimality. For instance -- let's give some 8 examples. 9 So publishers might want to preserve 10 their reputations. There might be long-term 11 strategic goals. Short-term profits. There could 12 be a lot of different things that could go into 13 the -- the definition of optimality for an 14 individual actor. 15 Q. You use the phrase "optimal strategies" 16 throughout your report. Do you have a general 17 definition for purposes of your report that we can 18 use going forward? 19 A. So I'm using the word "optimal" in the 20 same way we use in machine learning, where 21 "optimal" is defined with respect to the problem. 22 So you define an objective function, and then you 23 define an algorithm to optimize that objective 24 function. If you can optimize it, then you created 25 an optimal strategy.</p>	<p style="text-align: right;">Page 124</p> <p>1 we provided for the court reporter what we were 2 referring to as O&O data, owned and operated data, 3 and you referred to Section IV of your report. 4 In Section IV of your report, on page 36 5 there are four paragraphs, paragraphs 121 through 6 124, where you have a subheading titled "Data 7 Advantage from Google's Owned and Operated 8 Properties." 9 Do you see that? 10 A. Yes. 11 Q. Are you aware of any examples from the 12 evidence in this case of Google using the 13 owned and operated data that you referred to in 14 these paragraphs to bid on AdX? 15 A. So Google is able to use its own data 16 however it likes. 17 And I have, you know, the deposition 18 of -- there's all kinds of evidence cited here, 19 including the deposition of [REDACTED], 20 and -- I think the fact is that Google owns this 21 data. That's why it's called "owned and operated." 22 And it can use it however it likes. 23 Q. So you state that Google can use it 24 however it likes. My question is a little bit 25 different, which is do you have any evidence that</p>
<p style="text-align: right;">Page 123</p> <p>1 Q. In the context of what you just 2 described, how do you define the word "optimize"? 3 A. Yes. So optimize means try to get 4 closer to an optimal strategy. And, again, the 5 goals that determine what is optimal are 6 individual. Different publishers might have 7 different optimal strategies or different 8 definitions of optimality. The same thing with 9 advertisers. 10 Q. Again, for purposes of a general 11 definition, when you use the word "optimize" or 12 "optimal" are you referring to optimizing or 13 determining the optimal strategy to achieve certain 14 goals? 15 A. Yes. So you have your goals, and you're 16 trying to create a strategy to optimize those 17 goals. 18 Q. And in defining "optimal strategy" we're 19 using the word "optimize." I'm just want to make 20 sure we're speaking the same language. 21 So is it fair to say that in optimizing 22 you're trying to achieve a good outcome for whatever 23 that person's goals are? 24 A. Yes. 25 Q. Earlier today we talked briefly, because</p>	<p style="text-align: right;">Page 125</p> <p>1 Google does in fact use this data from 2 owned and operated properties when bidding on AdX? 3 A. Sorry. You're asking when Google uses 4 this data? 5 Q. My question is do you have any evidence 6 that Google does in fact use this data from 7 owned and operated properties when Google Ads bids 8 on AdX? 9 A. I mean, I've seen lots of internal 10 Google documents referencing these data. If you 11 want me to pinpoint something other than what's in 12 the report, it would take me a while to go through 13 and find it. 14 Q. So I'm looking at paragraphs 121 to 124 15 where you discuss Google's owned and operated data, 16 and on my read I don't see any evidence in these 17 paragraphs that Google uses this owned and operated 18 data when Google Ads bids into AdX. 19 A. So I will just read you, for instance, 20 one of the footnotes from page 37. "Owned & 21 Operated Ad Creation. Internal Google document on 22 Ads in Google Owned and Operated properties. Ad 23 creation for a new campaign type for Google Owned & 24 Operated properties." 25 So you have, you know, Google using its</p>

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<p style="text-align: right;">Page 126</p> <p>1 own data to create ads on its own properties, from 2 what I can tell. 3 Q. That doesn't say that Google Ads is 4 using data from owned and operated properties to 5 inform the bids that Google Ads makes on AdX; 6 correct? 7 MR. COLLIER: Objection. Form. 8 A. I'm reading this document differently 9 than you are, because it says "Internal Google 10 document on Ads in Google Owned and Operated 11 properties." 12 So you have Google owned and operated 13 properties creating ads, so, you know, you've got 14 ads created for itself, and so they're going to use 15 owned and operated data. 16 I can't imagine how that would not be 17 the way that this particular footnote should be 18 interpreted. So I'm not sure where you're going 19 with this. 20 Q. So there is a difference between 21 having -- Google having access to owned and operated 22 data and Google Ads using that owned and operated 23 data to bid on AdX. 24 MR. COLLIER: Objection. Form. 25 Q. And that's what I'm trying to get at</p>	<p style="text-align: right;">Page 128</p> <p>1 A. This is just the first citation I found 2 that mentions, you know, O&O data and ads. So if 3 you're telling me to interpret this as Google 4 doesn't use its O&O data to inform the data on its 5 O&O properties, I find that hard to believe. 6 I can try and find more references if 7 you like to, you know, O&O data use. But this is a 8 long document, and I could go and try to find it if 9 you like. 10 Q. Are you aware that Google does not sell 11 ads for its O&O properties on AdX? 12 A. What Google does is what Google does. 13 I'm not -- you can tell me things, but I'm not 14 going to believe it unless I see it in the 15 documents. 16 Q. Did you investigate whether Google sells 17 ads for its O&O properties on AdX? 18 A. I would need a lot more -- I would need 19 to go through some documents to sort of figure that 20 out, but I'm certainly not going to take anyone's 21 word for it. 22 Q. My question is whether you, in 23 connection with forming your opinions in this 24 report, investigated whether Google sells ads for 25 its O&O properties on AdX.</p>
<p style="text-align: right;">Page 127</p> <p>1 here. 2 So the question is, you described 3 various types of owned and operated data that Google 4 has, such as from YouTube, Google Play, Google 5 Search, Google Maps. And my question is whether you 6 have any evidence indicating that Google Ads as a 7 buying tool uses that owned and operated data to bid 8 on AdX? 9 A. I've seen documents beyond the ones that 10 I just showed -- the one that I just picked out, I 11 just happened to pick it out incidentally because 12 it happened to be on the page I was looking at. 13 And it's basically saying, as far as I can tell, 14 Google's owned and operated properties -- it says 15 "Owned & Operated Ad Creation." 16 And so it's using information to create 17 ads on Google owned and operated properties. 18 Are you telling me -- it seems like 19 you're telling me that those properties, their data 20 is not going into those ads, and I'm not sure I -- 21 I'm not sure I could possibly agree with that. 22 Q. What you're describing is owned and 23 operated properties where Google is displaying ads; 24 correct? 25 MR. COLLIER: Objection. Form.</p>	<p style="text-align: right;">Page 129</p> <p>1 A. And I told you that I would need to 2 actually go and look at documentation to try to 3 figure out exactly -- if you ask me things like how 4 exactly does Google use all of its data to inform 5 its predictions, I'm going to say, well, I don't 6 know. I mean, this is not information I 7 necessarily have -- it's a very detailed 8 information that I don't necessarily have access to 9 and don't necessarily remember all of the specifics 10 in these thousands and thousands of pages I've 11 read. 12 I do know that Google keeps track of 13 very, very detailed information on individuals for 14 the purpose of advertising. I do know that. I've 15 seen that many times in the Google internal 16 documents. 17 Q. Other than what you point to here in 18 footnote 66 on page 37, in paragraphs 121 through 19 124 of your report do you cite any other evidence? 20 A. I believe I do. For instance, there's a 21 footnote about "In an internal communication, 22 Google confirmed the distinct value of 'user 23 intent' information obtained from Search and Chrome 24 activity, noting that 'proactive search query is a 25 strong signal of user intent,' as a user is much</p>

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<p style="text-align: right;">Page 130</p> <p>1 more likely to make a purchase decision after 2 having searched for it." 3 And it says also in another document, 4 internal Google communication on use of search data 5 as a signal for audience targeting. And it talks 6 about GAIA IDs, which are IDs for users that track 7 them, and there's very detailed information about 8 users with GAIA IDs. 9 There's a lot of data about cookies. 10 I could keep going if you like. 11 Q. You're referring here about user intent 12 information that's in footnote 71? That's where you 13 were reading from? 14 A. Yes. And 74. I will keep going if you 15 like. 16 Q. Do you have any evidence that Google 17 used the data that you cite in footnote 71 or 74 to 18 inform Google Ads bids on AdX? 19 A. I'm not sure what type of evidence 20 you're looking for other -- it seems almost like I 21 would have to go look at the code to make you happy 22 with evidence. 23 I think these Google internal documents, 24 you know, these ones and the other ones that I have 25 seen, should suffice.</p>	<p style="text-align: right;">Page 132</p> <p>1 MR. COLLIER: I'm not sure she 2 was -- were you done -- 3 THE WITNESS: No, I wasn't. 4 MR. HUNSBERGER: I just wanted to 5 make sure where I should be following along. 6 A. "...to benefit display ads targeting 7 products." 8 So, I mean, like, you can tell me, oh, 9 but it doesn't use O&O, but that disagrees with 10 what I'm reading in this multitude of documents. 11 And this was only a few examples that I happen to 12 have right in front of me. 13 Q. What you pointed to right there, that 14 doesn't say that Google Ads used O&O data to inform 15 its bids on AdX; correct? 16 MR. COLLIER: Object. Form. 17 A. I think I've answered this question. I 18 think it's very clear that Google is using its O&O 19 data in many different ways to benefit ads 20 targeting products. Exactly what it says. 21 Q. So it would surprise you if you were to 22 learn that Google Ads does not use O&O data to 23 inform its bids on AdX? 24 A. That would disagree with all of these 25 internal documents that I have read.</p>
<p style="text-align: right;">Page 131</p> <p>1 Q. Do you agree that there is a difference 2 between collecting and tracking user data and using 3 user data for purposes of informing Google Ads bids 4 on AdX? 5 MR. COLLIER: Objection. Form. 6 A. Yeah, I didn't understand that 7 question -- 8 Q. Put differently, Google can track and 9 collect information about its own owned and operated 10 properties; correct? 11 A. Google can track information about its 12 owned and operated properties, yes. 13 Q. But there is a separate question of 14 whether Google uses that information to inform 15 Google Ads bids on AdX; correct? 16 MR. COLLIER: Object. Form. 17 A. So it's very clear to me that Google 18 uses its O&O data to inform bidding and -- I will 19 I've give you another quote. 20 "Specifically, we explore various 21 transfer learning techniques to use knowledges 22 from Google Owned and Operated Products, a/k/a O&O, 23 e.g. Google Search YouTube." 24 Q. Where are you reading from? 25 A. Footnote 80.</p>	<p style="text-align: right;">Page 133</p> <p>1 Q. So that would be a surprising fact to 2 you? 3 MR. COLLIER: Object. Form. 4 A. I've already answered the question. 5 Q. Would that be a surprising fact to 6 you -- 7 A. It would disagree with what I have read. 8 MR. COLLIER: Just give me a moment 9 to make my objection to form if I need to. I 10 don't want to interrupt your answer, but I do 11 want you to pause. The court reporter can't 12 take us both at once. 13 THE WITNESS: I'm sorry. 14 MR. COLLIER: It's okay. 15 BY MR. HUNSBERGER: 16 Q. Okay. Professor, I think at this point 17 we'll switch gears a little bit and talk about 18 Section V of your report, I believe it is. This 19 begins on page 46, paragraph 142. The heading of 20 the section is "Google's Auction Manipulations 21 Further Limit the Amount of Useful Information That 22 Buyers and Users Have For Machine Learning." 23 One of the optimizations that you 24 discuss in your report is Project Bernanke; is that 25 correct?</p>

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<p style="text-align: right;">Page 134</p> <p>1 A. Correct.</p> <p>2 Q. If we turn to paragraph 156 of your</p> <p>3 report, in the first sentence there you say, "The</p> <p>4 amount Bernanke changed bids depended on the [REDACTED]</p> <p>5 [REDACTED]</p> <p>6 [REDACTED]</p> <p>7 [REDACTED]</p> <p>8 Do you see that?</p> <p>9 A. Yes.</p> <p>10 Q. So it's your understanding that Bernanke</p> <p>11 [REDACTED]</p> <p>12 [REDACTED]; correct?</p> <p>13 MR. COLLIER: Objection. Form.</p> <p>14 A. Correct.</p> <p>15 Q. So it's your opinion that Bernanke did</p> <p>16 not use information about other bidders' bids in a</p> <p>17 live auction to compute the multiplier to be applied</p> <p>18 to the Google Ads bid in that same auction; correct?</p> <p>19 MR. COLLIER: Objection. Form.</p> <p>20 A. Sorry, Bernanke did operate on live</p> <p>21 data, if that's what you're asking.</p> <p>22 Q. My question is whether -- did Bernanke</p> <p>23 use information about other bidders' bids in a live</p> <p>24 auction to compute the multiplier to be applied to</p> <p>25 the Google Ads bid in that same auction.</p>	<p style="text-align: right;">Page 136</p> <p>1 Ads buyers to purchase otherwise unsold impressions;</p> <p>2 correct?</p> <p>3 MR. COLLIER: Objection.</p> <p>4 A. It did that, but a lot more, yes.</p> <p>5 Q. Turning to paragraph 149 of your report,</p> <p>6 you see that language that I was just reading in the</p> <p>7 first sentence of paragraph 149. "Google launched</p> <p>8 Project Bernanke to expand the number of auction</p> <p>9 wins in AdX by allowing Google Ads buyers to</p> <p>10 purchase otherwise unsold impressions."</p> <p>11 Do you see that language?</p> <p>12 MR. COLLIER: Objection. Form.</p> <p>13 A. Yeah, I believe that's the language you</p> <p>14 just read.</p> <p>15 Q. Correct. I just want to make sure we're</p> <p>16 all following along at the same paragraph.</p> <p>17 So Bernanke allowed Google Ads buyers to</p> <p>18 purchase additional impressions; correct?</p> <p>19 A. It did that as well as other things,</p> <p>20 yes.</p> <p>21 Q. Some of those impressions would have</p> <p>22 otherwise gone unsold?</p> <p>23 A. Some of those impressions would have</p> <p>24 gone unsold in AdX. They may have gone to another</p> <p>25 auction where they may have been sold later. They</p>
<p style="text-align: right;">Page 135</p> <p>1 MR. COLLIER: Objection. Form.</p> <p>2 A. I believe the answer is no, but I would</p> <p>3 need to double-check it.</p> <p>4 Q. Those multipliers were designed to</p> <p>5 sometimes increase bids to exceed the predicted bid</p> <p>6 of other AdX buyers; correct?</p> <p>7 A. Correct.</p> <p>8 Q. And those multipliers were designed to</p> <p>9 sometimes decrease bids to only slightly exceed the</p> <p>10 predicted bid of other AdX buyers; correct?</p> <p>11 A. I'm sorry, could you repeat that again?</p> <p>12 Q. Yes.</p> <p>13 And those Bernanke multipliers were</p> <p>14 designed to sometimes decrease bids to only slightly</p> <p>15 exceed the predicted bid of other AdX buyers;</p> <p>16 correct?</p> <p>17 A. That can definitely happen, yes.</p> <p>18 Q. Under Project Bernanke --</p> <p>19 A. Sorry, you said "other AdX bidders";</p> <p>20 right? Can you repeat that again?</p> <p>21 Q. I did. Other AdX bidders.</p> <p>22 A. Okay, thank you.</p> <p>23 Go ahead.</p> <p>24 Q. Under Project Bernanke Google expanded</p> <p>25 the number of auction wins in AdX by allowing Google</p>	<p style="text-align: right;">Page 137</p> <p>1 may have gone unsold totally. Yes.</p> <p>2 Q. And Bernanke did this without changing</p> <p>3 the price that the advertiser had to pay; correct?</p> <p>4 MR. COLLIER: Objection. Form.</p> <p>5 A. I'm not sure what you mean exactly, but</p> <p>6 in terms of the -- did the advertiser know that</p> <p>7 Bernanke was changing its price -- in other words,</p> <p>8 would it have paid the same price either knowing or</p> <p>9 not knowing -- sorry -- the advertiser didn't know</p> <p>10 that Bernanke was running -- I'm sorry, let me try</p> <p>11 that again.</p> <p>12 It's very complicated, because Bernanke</p> <p>13 did change the prices that advertisers paid,</p> <p>14 because it -- you know, if an advertiser bid and</p> <p>15 then the second price was lowered, then -- oh, no,</p> <p>16 the advertiser would still pay what the original</p> <p>17 second bid was.</p> <p>18 So -- yes, so the advertiser would pay</p> <p>19 whatever that second bid was into the internal</p> <p>20 Google Ads auction.</p> <p>21 Q. Understanding that it's complicated,</p> <p>22 we'll return to the question, which is:</p> <p>23 Bernanke did not change the price that</p> <p>24 the advertiser had to pay; correct?</p> <p>25 MR. COLLIER: Objection. Form.</p>

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<p style="text-align: right;">Page 138</p> <p>1 A. In the sense that if Bernanke was 2 operating one auction and the bids were the same in 3 the internal Google Ads auction and then the same 4 situation happened again without Bernanke, the same 5 two bids, then the advertiser would pay the same to 6 Google, yes. 7 Q. In your report, on page 54, paragraph 8 160, the sentence that begins with "Likewise." 9 Do you see that? 10 A. Yes. 11 Q. "If Bernanke lowers the clearing price, 12 the seller's model may respond by lowering floor 13 prices in the future." 14 Do you see that language? 15 A. Yes. 16 Q. Do you have any empirical evidence to 17 support that statement? 18 MR. COLLIER: Objection. Form. 19 A. This is in an abstract auction, so it is 20 not -- this is an abstract setting. It's not even 21 pertaining to Google necessarily. 22 Oh, sorry -- I'm sorry -- we're in the 23 other section. I forgot which section we were in. 24 Let me just step back a second to think. 25 Sorry, are you looking for evidence of a</p>	<p style="text-align: right;">Page 140</p> <p>1 A. Many things may happen or may not 2 happen. So yes, it may not happen. 3 Q. You just said you don't have the data to 4 determine the answer to my question. 5 Do you have any academic research that 6 would support that opinion? 7 A. I mean, it's a logical conclusion from 8 the situation that I'm describing here, so -- it's 9 kind of a basic calculation. 10 Q. Did you observe any publisher model that 11 actually did this? 12 MR. COLLIER: Objection. Form. 13 A. So, again, you're asking me for some 14 very specific information about a particular 15 publisher, and I don't have any of that type of 16 data, so there's no way I could possibly answer 17 affirmatively to that question. 18 Q. You used the word "may" in the sentence 19 to describe something that is logically possible; is 20 that fair? 21 MR. COLLIER: Objection. Form. 22 A. The way we used it here was that they 23 may do this because it makes logical sense that 24 they would. 25 Q. In the next sentence of the paragraph</p>
<p style="text-align: right;">Page 139</p> <p>1 particular auction where -- particular set of 2 auctions where some behavior occurred? Because I 3 could not provide that to you no matter what, 4 because I don't have data -- that kind of very 5 detailed data on who did what when. 6 Q. So yeah, my question is you seem to 7 be -- correct me if I'm wrong or add any context 8 that you think is appropriate, but you seem to be 9 describing something that may happen. 10 You say "if Bernanke lowers the clearing 11 price, the seller's model may respond by lowering 12 floor prices in the future." 13 So my question is do you have any 14 empirical evidence that the seller's model did 15 respond by lowering floor prices in the future? 16 A. So you're asking me for something that 17 there's no possible way I would be able to produce 18 because it would require me to actually have 19 knowledge of what an exact seller is doing, and I 20 don't have any kind of data like that. 21 Q. So you're describing a theory of 22 something that may happen; correct? 23 MR. COLLIER: Objection. Form. 24 A. It uses the word "may." 25 Q. And it may not happen as well?</p>	<p style="text-align: right;">Page 141</p> <p>1 you say, "If the seller lowers floor prices, the 2 model may reduce revenue for seller." 3 Do you see that? 4 A. Yes. 5 Q. Do you have any empirical evidence to 6 support that statement? 7 MR. COLLIER: Objection. Form. 8 A. So, again, if you're asking me to talk 9 to a specific publisher and ask what their strategy 10 is, that's not something I would have had access to 11 do or would have done, so I wouldn't be able to 12 answer your question. 13 Q. And in the documents and data produced 14 in this case did you observe any publisher model 15 that actually lowered floor prices and led to 16 reduced publisher revenue in response to Bernanke? 17 MR. COLLIER: Objection. Form. 18 A. Okay, you're asking for sort of 19 responses to Bernanke, and there were citations 20 here on responses to Bernanke listed in the 21 footnotes throughout this report, and there are a 22 couple of -- ones that would probably answer your 23 question nicely. I would just need a few minutes 24 to find them. 25 Would you like me to do that?</p>

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1 Q. I'm aware of the materials you cite in
2 your report, so unless you have anything beyond
3 what's written in your report we can move on.
4 A. Okay. I think we can move on.
5 Q. Ultimately Project Bernanke increased
6 overall publisher revenue; correct?
7 MR. COLLIER: Objection. Form.
8 A. You're asking me about -- okay. So
9 let's step back a second.
10 So you're asking me about whether this
11 particular program increased -- increased relative
12 to what. Right? And so, you know, you've got
13 sellers who are not in good shape either with or
14 without Bernanke. And so you're saying, well, it's
15 better than this. But both options are bad, so
16 it's not really like I can say, oh, yeah, it's been
17 super helpful for everybody. So -- yeah.
18 Q. Let's turn to a document.
19 (Rudin Exhibit 3, Bates
20 GOOG-AT-MDL-004555192, marked for
21 identification, as of this date.)
22 BY MR. HUNSBERGER:
23 Q. I'm handing you a copy of an exhibit
24 that has been marked Rudin Exhibit 3. This is a
25 copy of a document bearing the Bates number

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1 GOOG-AT-MDL004555192. This is a document that you
2 cite in footnotes 120 and 185 of your report.
3 A. Okay.
4 (Witness reviews document.)
5 Q. Professor, you cite this document in
6 your report.
7 Are you familiar with it?
8 A. I'm still reading it. Could you give me
9 a minute?
10 Q. For your context, I will have questions
11 on page ending in 196.
12 A. Oh, thank you. That's helpful.
13 (Witness reviews document.)
14 Q. Professor, you've had about 10 minutes
15 to review the document. Are you ready for some
16 questions on page 196?
17 A. Almost. I'm sorry. I'm not a fast
18 reader.
19 MR. COLLIER: Nor do I believe it's
20 been 10 minutes.
21 Q. Professor, are you ready to proceed with
22 questions? It's been about 15 minutes since we
23 introduced the exhibit.
24 MR. COLLIER: Counsel, I am again
25 going to interject. You stating facts, it is

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1 what it is. You've put -- since you're going
2 to speak on the record, you put a document
3 which is Bates numbered 4,500,000 in the
4 record and act like she's supposed to have
5 memorized this and not be able read it before
6 you ask her questions under oath.
7 So, Dr. Rudin, you read that until
8 you're comfortable you can answer questions
9 under oath about it, but don't take any longer
10 than you need.
11 MR. HUNSBERGER: I'm certainly not
12 rushing the witness. I gave her 15 minutes
13 uninterrupted.
14 MR. COLLIER: First of all, it
15 wasn't uninterrupted. You decided you would
16 throw down a marker at 10 minutes, as you
17 called it. So we are now onto the second
18 interruption. She would probably be done by
19 now if it wasn't for you.
20 Continue, Dr. Rudin.
21 THE WITNESS: Thank you.
22 A. Okay. I might need to look again at
23 this page 196, but I think you can go ahead and ask
24 your question.
25 Q. Thank you, Professor.

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1 You cite this document in your report;
2 is that correct?
3 A. I've read this document several times,
4 and I've cited different parts of it in my report.
5 Q. So you consider it reliable enough to
6 rely on in your report?
7 MR. COLLIER: Objection. Form.
8 A. The word "rely" is a little bit tricky
9 because this is an internal discussion at Google.
10 So I rely upon the fact the Google employees were
11 talking about these things, but that's about it.
12 Q. Looking at page 196, the only page of
13 this eight-page document that I plan to ask you
14 about, if we look at bullet point number 5, do you
15 see where it says, [REDACTED]
16 [REDACTED]
17 A. Sure.
18 Q. That quote continues, "[REDACTED]"
19 [REDACTED]
20 [REDACTED]
21 [REDACTED]
22 [REDACTED]
23 [REDACTED]
24 Do you see that quote?
25 A. I see that quote.

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1 Q. In the aggregate, Bernanke increased
2 publisher revenue; correct?
3 MR. COLLIER: Objection. Form.
4 A. So again, you know, you're talking, kind
5 of, there are certain auctions where Bernanke
6 increased publisher revenue and there are other
7 auctions where it decreases publisher revenue. And
8 in fact happens to be the page I'm just sitting on
9 here, talking about Global Bernanke. [REDACTED]
10 [REDACTED]
11 [REDACTED]
12 So I can't really answer your
13 question -- well, I think I've answered your
14 question actually.
15 Q. For publishers as a class, so all
16 publishers, in the aggregate Bernanke increased
17 publisher revenue, correct?
18 A. Again, we don't aggregate all
19 publishers. We talk about some publishers [REDACTED]
20 [REDACTED]. I
21 mean, some things went up, some things went down,
22 but there were some real losers.
23 Q. And you don't have any evidence that
24 Bernanke decreased publisher revenue in the
25 aggregate; do you?

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1 MR. COLLIER: Objection. Form.
2 A. All right. I'm just going to read from
3 my report here.
4 "I understand that the variance created
5 by Bernanke had revenue impacts that were not
6 necessarily easy to predict in advance. For
7 instance, [REDACTED]
8 [REDACTED]
9 [REDACTED]
10 [REDACTED]
11 [REDACTED]
12 [REDACTED]
13 [REDACTED]
14 [REDACTED]
15 [REDACTED]
16 [REDACTED]
17 Q. What you're describing there is
18 referring to specific individual publishers; is that
19 correct?
20 A. Yes.
21 Q. Publishers as a class, all publishers in
22 the aggregate experienced increased publisher
23 revenue under Bernanke; correct?
24 A. I can't agree to that. I can't agree to
25 that kind of summarization, that -- no, I just

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1 don't believe that's true.
2 Q. Do you offer any opinion that Bernanke
3 decreased publisher revenue in the aggregate?
4 MR. COLLIER: Objection. Form.
5 A. I don't agree that it's okay to do that
6 kind of aggregation. So for every Bernanke win,
7 there was another loss, right? Because Bernanke
8 would change the result of an auction. So, you
9 know, I just -- and I've read your paragraphs
10 talking about notable losers of Bernanke. So, you
11 know, I just can't agree with what you said.
12 Q. So you're referring to specific
13 individual publishers who, in your characterization,
14 were "losers" under Bernanke; correct?
15 MR. COLLIER: Objection. Form.
16 A. Shall I read it again?
17 Q. No. It's just a question of what you're
18 describing in your report is specific individual
19 publishers that you describe as "losers" under
20 Bernanke; correct?
21 A. It was not my description. This was an
22 internal Google document I read from.
23 Q. But, again, you're referring to specific
24 individual publishers; correct?
25 A. I pointed out that [REDACTED]

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1 [REDACTED]
2 [REDACTED] So you could talk about
3 individual publishers, but there is many individual
4 publishers who were losers from Bernanke and Global
5 Bernanke.
6 Q. But you're not offering an opinion that
7 all publishers as a whole faced reduced revenue
8 under Bernanke; correct?
9 MR. COLLIER: Objection. Form.
10 A. I'm just saying I don't want to
11 characterize all publishers because they're not a
12 monolith.
13 Q. So you do not offer any opinion on all
14 publishers, correct, because you don't think it's
15 proper?
16 MR. COLLIER: Objection. Form.
17 You both are New York, so you're
18 very fast. Just pause for a second, let me
19 say objection to form, and I know you want to
20 answer.
21 Go ahead.
22 THE WITNESS: Sorry.
23 A. Okay. I wouldn't even know how to sort
24 of say in the aggregate over individual.
25 So, for example, do I average based on,

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<p>1 you know, the average over all the publishers</p> <p>2 weighted by the amount of money they gain from the</p> <p>3 auctions or -- I just don't even know how that</p> <p>4 aggregation even makes sense.</p> <p>5 You're saying let me average over</p> <p>6 companies. Well, how do you do that average?</p> <p>7 Like, you could weight in 20,000 different ways.</p> <p>8 So there's not a standard way of aggregating, so</p> <p>9 I'm not really sure how I can best answer your</p> <p>10 question other than to say it's not well defined.</p> <p>11 Q. So before Bernanke, publishers made a</p> <p>12 certain amount of revenue. After Bernanke,</p> <p>13 publishers made a certain amount of revenue.</p> <p>14 My question is whether you offer any</p> <p>15 opinion about the amount that publishers as a whole</p> <p>16 in the aggregate made before Bernanke versus the</p> <p>17 amount that publishers as a whole made after</p> <p>18 Bernanke?</p> <p>19 MR. COLLIER: Objection. Form.</p> <p>20 A. I'm sorry if my answer last time wasn't</p> <p>21 clear. I will try it again. Which is that it's</p> <p>22 not clear how you can do that kind of aggregation</p> <p>23 because you're asking me to aggregate over</p> <p>24 companies. These are not just numbers. These are</p> <p>25 companies. So I would have to figure out how to do</p>	<p>1 Q. Do you have any reason to doubt the</p> <p>2 statement that Bernanke increases advertiser</p> <p>3 impression/click/conversion volume?</p> <p>4 A. So --</p> <p>5 MR. COLLIER: Objection. Form.</p> <p>6 A. Thank you. Sorry.</p> <p>7 The idea with Bernanke is that -- give</p> <p>8 me a second.</p> <p>9 Yeah, so the goal is keep more money</p> <p>10 circulating so that -- this is the idea with</p> <p>11 Bernanke, that if there's more money circulating</p> <p>12 into the system, it would increase the volume of</p> <p>13 wins for Google advertisers.</p> <p>14 MR. HUNSBERGER: Professor, we've</p> <p>15 been going over an hour. I would like to talk</p> <p>16 about another document, so if it's a good time</p> <p>17 for you to take a break, I'm happy to take a</p> <p>18 break.</p> <p>19 THE WITNESS: Thank you.</p> <p>20 THE VIDEOGRAPHER: We're going off</p> <p>21 the record. The time is 2:58 p.m.</p> <p>22 (Recess taken.)</p> <p>23 THE VIDEOGRAPHER: Going back on</p> <p>24 the record. The time is 3:15 p.m.</p> <p>25 BY MR. HUNSBERGER:</p>
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<p>1 that aggregation. And in statistics there are many</p> <p>2 different ways to aggregate, and I don't know of</p> <p>3 one that would actually represent the answer that</p> <p>4 you're looking for. So I just can't do that kind</p> <p>5 of aggregation because it's not well defined.</p> <p>6 Q. Do you have any reason to believe that</p> <p>7 this document's statement that Bernanke increases</p> <p>8 publisher revenue is incorrect?</p> <p>9 MR. COLLIER: Objection. Form.</p> <p>10 A. So this document is someone's opinion</p> <p>11 about -- I'm sorry, where is it?</p> <p>12 Its goal is to increase publisher</p> <p>13 revenue. This is Google employees talking</p> <p>14 internally. And so they're talking about a general</p> <p>15 strategy, and they're saying this is what we --</p> <p>16 this is what we think should happen, and that's as</p> <p>17 much as I'm taking from that.</p> <p>18 Q. Do you see the language in this same</p> <p>19 portion of the document on page 196 that refers to</p> <p>20 "This increases advertiser</p> <p>21 impression/click/conversion volume"?</p> <p>22 A. Where are you reading from?</p> <p>23 Q. The same bullet, Number 5.</p> <p>24 A. Yeah, I see where it says that. I see</p> <p>25 where this Google employee is talking about that.</p>	<p>1 Q. Professor Rudin, before the break we</p> <p>2 were talking about Project Bernanke, and you</p> <p>3 referred to a document I believe that you cite in</p> <p>4 your report at footnote 131. I would like to take a</p> <p>5 look at that exhibit.</p> <p>6 A. Okay.</p> <p>7 (Rudin Exhibit 4, Bates</p> <p>8 GOOG-AT-MDL-B-0024514119, marked for</p> <p>9 identification, as of this date.)</p> <p>10 BY MR. HUNSBERGER:</p> <p>11 Q. This is a one-page document bearing the</p> <p>12 Bates number GOOG-AT-MDL-B-0024514119, marked for</p> <p>13 the record as Rudin Exhibit 4. Just let me know</p> <p>14 when you have had a chance to review it, and we can</p> <p>15 talk about it.</p> <p>16 A. Yep, I see it.</p> <p>17 Q. So you in footnote 131 quote this</p> <p>18 portion of the document toward the bottom that</p> <p>19 starts with the words "A couple."</p> <p>20 A. I don't believe that's the footnote I</p> <p>21 cited.</p> <p>22 Q. I'm looking at footnote 131 of your</p> <p>23 report.</p> <p>24 A. But you asked me did you cite that</p> <p>25 footnote, and I think I cited a different footnote.</p>

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1 But that's fine, I see footnote 131.
2 Q. Do you see the language you quote in
3 footnote 131 in this document, the sentence that
4 begins [REDACTED]
5 [REDACTED]
6 [REDACTED]"
7 Do you see that?
8 A. Yes.
9 Q. Do you see the last sentence of that
10 same paragraph that begins with the word "Overall"?
11 A. Yes, I see where it says that.
12 Q. "Overall, AdX pubs gain over [REDACTED]
13 annually."
14 Do you see that?
15 A. I see where it says that.
16 Q. Do you have any reason to dispute that
17 overall AdX publishers gained over [REDACTED] as a
18 result of Project Bernanke?
19 MR. COLLIER: Objection. Form.
20 A. First of all, the word "overall," it's
21 not clear how that was computed.
22 Second of all, you're talking about,
23 like, from one thing they did to the next thing,
24 but it's, again, like, they're both sort of bad.
25 They're both sort of bad. And publishers, you

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1 know, don't necessarily benefit from this.
2 The things I was quoting are things
3 about publishers losing a lot of money. So you've
4 got -- you know, you're saying, look, they've
5 improved this much.
6 Well, it's like you've calculated this
7 versus that, but neither of these two things is
8 particularly good. So, there you go.
9 Q. So it's your opinion that publishers
10 don't benefit from making [REDACTED] annually more
11 per year?
12 MR. COLLIER: Objection. Form.
13 A. Again, the publishers, because of
14 Bernanke -- first of all, the publishers don't have
15 enough data to detect Bernanke. And so if you're
16 talking about, like, you know, what would be a good
17 alternative, well, it wouldn't be Google with
18 Bernanke versus Google without Bernanke. It would
19 be something completely different.
20 Q. If we are analyzing the impact of
21 Project Bernanke, the relevant comparison is a world
22 with Bernanke and a world without Bernanke; correct?
23 A. No. It's a world with Google and
24 without Google.
25 Q. And you think a world without Google,

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1 publishers make more money?
2 A. I think if circumstances were different,
3 publishers would make more money because they could
4 estimate things.
5 And, you know, I talk about -- a lot
6 about sort of variance and how Bernanke changes all
7 the bids so every time there's a new winner,
8 there's potentially a new loser.
9 So you know, you're saying, okay, well,
10 there's some amount of money that was transferred
11 from one place to another. But, you know, maybe
12 this overall thing doesn't include, sort of, for
13 instance, publishers' long-term goals where they
14 care about the reputation. Right? Because
15 Bernanke boosts lower bidders above. Right? And
16 maybe publishers want to be able to estimate price
17 floors themselves but Bernanke messes with the
18 signal. Right?
19 So you're talking about, you know -- and
20 maybe even if these ads were not sold on AdX, maybe
21 they would have been sold on another ad auction and
22 the publishers would have gained that [REDACTED]
23 that way.
24 So I just can't agree with the -- you
25 know, the statement that overall blah, blah, blah,

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1 is true, because I just don't agree with that.
2 Q. What is your basis for disagreeing?
3 MR. COLLIER: Objection. Form.
4 Go ahead.
5 A. I answered that already. I gave several
6 reasons.
7 Q. What is your basis for disagreeing with
8 the statement here?
9 MR. COLLIER: Objection. Form.
10 Q. You can answer.
11 MR. COLLIER: You can answer.
12 A. I will try to repeat my answer as best I
13 can.
14 So this overall, I'm not sure how it's
15 computed first of all. And the publishers, you
16 know, you're -- Google is saying here publishers
17 gain over [REDACTED]. Well, what does that mean?
18 Does that mean, like, you know, that ads that would
19 have been sold on other auctions now are sold on
20 AdX, and so the publisher got [REDACTED] from AdX?
21 So maybe the publisher would have gained more by
22 having other auctioneers serve their impressions.
23 What about the fact that Bernanke
24 changes the winner of the auction so that lower
25 bidders -- all of a sudden these low-quality

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<p style="text-align: right;">Page 158</p> <p>1 advertisers can now serve their ads? Maybe the 2 publishers wouldn't appreciate that. So maybe 3 that's not following the publisher's objectives. 4 So I'm not sure that, you know, this 5 number sort of represents the full context of 6 what's going on. 7 Q. You do cite this document for the 8 proposition in your report in paragraph 157 that 9 [REDACTED] 10 [REDACTED] correct? 11 MR. COLLIER: Objection. Form. 12 A. This document says that, yes. I mean, 13 there's other documents that say -- I mean, define 14 publisher, whatever I quoted before. 15 So this is one document of many that 16 evaluates Bernanke. Would you like me to find the 17 others? Would that help? 18 Q. That wasn't my question. I was just 19 saying do you cite this document in footnote 131 to 20 support the statement in paragraph 157 of your 21 report that [REDACTED] 22 [REDACTED]? 23 A. I do cite this to say [REDACTED] 24 [REDACTED] 25 [REDACTED]</p>	<p style="text-align: right;">Page 160</p> <p>1 publishers. That's something I can count on my 2 hand. 3 Second of all, the way that you've asked 4 the question implies that whatever the -- whatever 5 way this number is computed, that this would be the 6 only benefit to publishers, and I -- or, you know, 7 the only impact to publishers, and I would disagree 8 with that, if that's where you're going with this 9 question. 10 Q. Do you know exactly how the [REDACTED] 11 [REDACTED] that you cite was calculated? 12 A. I assume this revenue drop is per 13 publisher, calculated by either the publishers or 14 publishers' -- I assume they're publishers or the 15 publishers' tools are reporting these numbers for 16 particular publishers. But when you say something 17 like "overall," that implies some kind of average, 18 and I don't know the way that average was computed. 19 Because if you know statistics, you know there are 20 many ways to compute averages. 21 Q. So you assume this is how the revenue 22 drop was calculated, but you don't know that that's 23 how it was calculated; correct? 24 A. Well, it says [REDACTED] 25 [REDACTED] So I'm going to</p>
<p style="text-align: right;">Page 159</p> <p>1 Q. You find that statement to be reliable? 2 A. These Google people thought it was true. 3 And so, you know, there's a good reason for me to 4 cite that right there. 5 Q. And these people at Google thought that 6 overall AdX pubs gained over [REDACTED] annually; 7 correct? 8 A. Like I said, the word "overall" is kind 9 of loaded because I don't know how they computed 10 it, and I don't know whether this number indicates 11 sort of a -- you're implying that this number means 12 publishers gained [REDACTED] annually and that's 13 the only thing they cared about, and I don't agree 14 with that. 15 Q. So you chose to believe one statement in 16 this document that supports your theory and you 17 chose to disbelieve another statement that 18 undermines your theory; correct? 19 A. No, that's not what I said at all. 20 Let's try again. 21 I'm not sure how the word "overall" is 22 computed in this particular person's calculation, 23 so I don't know what that means. Whereas in the 24 other place he stated it he says a couple of 25 publishers. It's like, okay, I know a couple of</p>	<p style="text-align: right;">Page 161</p> <p>1 take that at face value. 2 Q. So you apply one standard of rigor to a 3 piece of evidence that supports your theory, and you 4 apply a different, stricter standard of rigor to 5 evidence that undermines your theory; correct? 6 A. No, that is not correct. I'm applying 7 the same standard of rigor. 8 MR. HUNSBERGER: I would like to 9 discuss another document that you cite in your 10 report. This one is cited in footnotes 132 11 and 133. 12 (Rudin Exhibit 5, E-mail chain, 13 Bates GOOG-AT-MDL-B-002096117, marked for 14 identification, as of this date.) 15 MR. HUNSBERGER: This is a document 16 bearing the Bates GOOG-AT-MDL-B-002096117, 17 one-page document, that has been marked Rudin 18 Exhibit 5. 19 I will hand you a copy. 20 MR. COLLIER: Excuse me, Counsel. 21 Do you have a copy for us? Oh, sorry, didn't 22 make its way. 23 THE WITNESS: Okay. 24 BY MR. HUNSBERGER: 25 Q. As I mentioned, you cite this document</p>

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1 in footnotes 132 and 133 of your report; is that
2 correct?
3 A. Yes.
4 Q. The subject line of this document, which
5 appears to be an e-mail, refers to "Global
6 Bernanke."
7 Do you see that?
8 A. Yes.
9 Q. Now, in the first-in-time e-mail, so at
10 the bottom of the page, do you see the e-mail dated
11 February 13, 2015 at 11:48 a.m. from a [REDACTED]
12 [REDACTED]?
13 A. Yes.
14 Q. And the third paragraph of that e-mail
15 that begins, "Among 500 large pubs"?
16 A. Um-hmm.
17 Q. And the document reads, "[REDACTED]
18 [REDACTED]
19 [REDACTED]
20 [REDACTED]
21 [REDACTED]
22 Do you see that?
23 A. Yes.
24 Q. If we look at page 53 of your report,
25 paragraph 157 --

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1 A. Um-hmm.
2 Q. -- and this is above the line text
3 corresponding with footnote 132, the sentence that
4 begins "After the launch."
5 A. Sure.
6 Q. You state, "After the launch of Global
7 Bernanke, Google found that [REDACTED]
8 [REDACTED]
9 Do you see that language?
10 A. Um-hmm.
11 Q. But the document that we just looked at
12 says [REDACTED]; correct?
13 A. Correct.
14 Q. It does not say [REDACTED]
15 [REDACTED]; correct?
16 A. I'm not seeing much difference. This is
17 a simulation, and so this is what they're saying is
18 going to happen when they launch this thing.
19 Q. What's your basis for that?
20 MR. COLLIER: Objection. Form.
21 A. I'm reading this in context. I read
22 this document and ones around it, and this is
23 how -- they're doing these simulations to figure
24 out what's going to happen. That's why they're
25 doing the simulations.

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1 Q. In your opinion, the word "could"
2 typically means some possibility; correct?
3 A. Yes.
4 Q. But it does not mean a certainty;
5 correct?
6 A. Are you saying that this document is not
7 reliable? I mean, in the sense of you don't
8 believe that the Google simulations are viable?
9 Because it seems to me that what you're
10 asking me to do is try to figure out whether these
11 Google simulations have a -- you know, can measure
12 the -- what's going to happen. And, you know, this
13 is what I have to work from.
14 Q. All I'm asking is whether the words
15 "could" and "would" in this context have different
16 meanings.
17 A. In this context, they're saying if we
18 launch this right now, this is what's likely going
19 to happen.
20 And I'm reading both of these, "could"
21 and "would," as this is likely what's going to
22 happen.
23 Q. Do you cite any evidence in this
24 paragraph that indicates there was actually a [REDACTED]
25 [REDACTED]?

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1 A. And these are simulations, so what you
2 are seeing here is, you know, Google doing the best
3 it can to calculate what -- what happens with this
4 program. So I'm taking that at its value.
5 Q. Professor Rudin, did you conduct any
6 empirical analysis regarding whether Project
7 Bernanke lead to decreased publisher revenues?
8 MR. COLLIER: Objection. Form.
9 A. I found a lot of internal documents
10 where Google did their own experiments and cited
11 those in their report rather than doing my own
12 experiments on Google data, which, you know, doing
13 that -- doing experiments on that Google data at
14 that point in time would be impossible for me to do
15 at this point in time.
16 Q. You did not conduct any of your own
17 analysis of Google's data to determine whether
18 Project Bernanke lead to decreased publisher
19 revenues; correct?
20 MR. COLLIER: Objection. Form.
21 A. I think I already answered that question
22 a second ago.
23 Q. I didn't get a clean answer, so I want
24 to make sure we're being clear for the record.
25 Did you conduct any of your own analysis

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<p style="text-align: right;">Page 166</p> <p>1 of Google's data to determine whether Project 2 Bernanke led to decreased publishers' revenue? 3 MR. COLLIER: Objection. Form. 4 A. So, again, I'm relying on Google's own 5 internal experiments on the effects of things, as 6 well as the other reports, the other expert reports 7 in the case. 8 And trying to conduct experiments from a 9 particular point in time right now is impossible 10 since the world has changed. So there's no way I 11 could have done that. 12 Q. Do you view Google's own internal 13 experiments on the effects to be reliable? 14 A. I'm not sure what you're asking me here. 15 I mean, I believe this is the calculations they 16 did, and this is what they shared internally. 17 Q. Do you view the calculations that they 18 did under their own internal experiments to be 19 reliable? 20 A. They're the best I have. So I believe 21 that they have done these experiments and that this 22 is what they believe, and I believe these 23 statistics are -- yeah, I believe in the sense that 24 this is actually what they actually got from these 25 simulations.</p>	<p style="text-align: right;">Page 168</p> <p>1 Q. If sellers could set floor prices 2 optimally, Bernanke would not be possible since 3 publishers could set the floor just below the 4 highest bid and Bernanke could not drop the second 5 bid to accumulate the pool; correct? 6 A. Correct. 7 Could you tell me where you're reading 8 from? 9 Q. I was summarizing a couple of your 10 opinions at 149 and 176. 11 A. Okay. 12 Q. Bernanke also weakens the effectiveness 13 of machine learning for both buyers and sellers 14 because Bernanke alters the clearing price of the 15 auction, which is a variable that both buyers and 16 sellers would use in machine-learning models; is 17 that correct? 18 A. Yes. 19 Q. Is it your opinion that even if Bernanke 20 was fully disclosed, publishers still could not 21 optimize floor prices? 22 A. Correct. 23 Q. Professor Rudin, if we could move on to 24 another optimization that you discuss in your 25 report.</p>
<p style="text-align: right;">Page 167</p> <p>1 Q. If we turn to paragraph 148 in the 2 "Bernanke" section, you state in this paragraph that 3 publishers and advertisers would not create a model 4 to optimize their strategies with respect to 5 Bernanke; correct? 6 A. Yes. It's very difficult to optimize 7 while Bernanke is running. 8 Q. Is it your opinion that the details of 9 Project Bernanke were not disclosed to customers? 10 A. They weren't sufficiently disclosed, 11 indeed. In fact, this footnote here says -- it is 12 from Milgrom's report -- "While the specific 13 details of Project Bernanke were not communicated 14 to advertisers or publishers." So yes, I believe 15 that. 16 Q. It's also your opinion that sellers and 17 buyers never knew which queries were being 18 subsidized, which made estimation and response by 19 sellers and buyers more difficult? 20 A. Yes. 21 Q. Do I understand correctly your opinion 22 that publishers could not create a model to optimize 23 their strategies with respect to Bernanke in part 24 because sellers cannot optimize floor prices? 25 A. Yes.</p>	<p style="text-align: right;">Page 169</p> <p>1 I would like to discuss the optimization 2 known as reserve price optimization, or the acronym 3 RPO for short. 4 If I refer to "RPO" in this deposition, 5 you will understand that I'm referring to reserve 6 price optimization? 7 A. Yes. 8 Q. If we turn to paragraphs 183 and 184 of 9 your report, that's where you begin to discuss RPO? 10 A. Correct. 11 Q. You agree that RPO increased publishers' 12 price floors to help them earn more revenue? 13 A. I agree it increased publishers' price 14 floor. I'm not going to make a comment on overall 15 revenue because, again, we're talking about, you, 16 know publishers' overall objectives, and they may 17 not just be short-term revenue. 18 When I say "short-term," I mean in the 19 auction. 20 Q. Do you offer any opinion on the effect 21 of RPO on publisher revenue? 22 A. Yeah. So -- yeah, I do. 23 Q. What is that opinion? 24 A. It's all over this thing. There's 25 several opinions. Shall I try to start giving</p>

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<p style="text-align: right;">Page 170</p> <p>1 some?</p> <p>2 Q. I understand you have several opinions</p> <p>3 in your report on RPO. I was interested</p> <p>4 specifically in what your opinions are on the</p> <p>5 question of whether RPO increased publisher revenue</p> <p>6 or it decreased publisher revenue. Any opinion that</p> <p>7 you have on the impact of RPO on publisher revenue.</p> <p>8 A. So let's just -- let's see here.</p> <p>9 There is something about RPO in here. I</p> <p>10 want to talk about the overall kind of point that</p> <p>11 we shouldn't be considering RPO versus not RPO,</p> <p>12 again, because that's a narrow comparison that</p> <p>13 still leaves Google in place with not giving</p> <p>14 publishers enough information to optimize their own</p> <p>15 price floors.</p> <p>16 And so if you want to compare no RPO to</p> <p>17 RPO, well, this is like saying, well, you know,</p> <p>18 should you not do machine learning with all this</p> <p>19 information to estimate your price floor or should</p> <p>20 you have Google do it. And the ideal situation is</p> <p>21 the publisher could do it themselves. So that's</p> <p>22 the correct comparison.</p> <p>23 I can try to find, if you want, more</p> <p>24 information on RPO that I have in the report.</p> <p>25 Q. Is it your opinion that RPO did not have</p>	<p style="text-align: right;">Page 172</p> <p>1 Q. You then say in paragraph 184, this</p> <p>2 happens without -- this happens with the sellers'</p> <p>3 knowledge; correct?</p> <p>4 A. I'm sorry? Could you repeat that? This</p> <p>5 happens.</p> <p>6 Q. With the sellers' knowledge?</p> <p>7 A. With the sellers' knowledge? I'm sorry,</p> <p>8 where are you reading?</p> <p>9 Q. We can move on.</p> <p>10 Turning now to how RPO operated, sellers</p> <p>11 could optimize per-buyer floor prices; correct?</p> <p>12 A. There are different points in time. So,</p> <p>13 I mean -- sorry, can you say that again?</p> <p>14 Q. Under RPO, sellers could optimize</p> <p>15 per-buyer floor prices; correct?</p> <p>16 A. Sorry, I'm getting very confused,</p> <p>17 because sometimes the sellers don't even know who</p> <p>18 won the auction. So how could they possibly</p> <p>19 optimize per-buyer floor prices?</p> <p>20 Q. In your report you state that "Sellers</p> <p>21 could not optimize per-buyer floor prices well, as</p> <p>22 they did not have enough data."</p> <p>23 Do you see that in paragraph 184?</p> <p>24 A. Yes.</p> <p>25 Q. But it's not your opinion that sellers</p>
<p style="text-align: right;">Page 171</p> <p>1 any impact on the ability of publishers to optimize?</p> <p>2 MR. COLLIER: Object. Form.</p> <p>3 A. So RPO does make it more difficult to do</p> <p>4 optimization.</p> <p>5 Q. If there were no RPO, would publishers</p> <p>6 be able to optimize?</p> <p>7 A. As I mentioned, no, because publishers</p> <p>8 don't have the data to do that optimization.</p> <p>9 Google has more data than the publishers.</p> <p>10 Q. You indicate that publishers and</p> <p>11 advertisers could not create a model to optimally</p> <p>12 respond to RPO; is that correct?</p> <p>13 A. I'm sorry. Could you repeat the</p> <p>14 question?</p> <p>15 Q. You indicate in paragraph 183 that</p> <p>16 publishers and advertisers could not create a model</p> <p>17 to optimally respond to RPO; correct?</p> <p>18 A. Correct.</p> <p>19 Q. You also describe one of the main issues</p> <p>20 in your abstracted auction with Program R is that</p> <p>21 the auctioneer sets floor prices for other bidding</p> <p>22 tools much higher than the sellers' floor prices in</p> <p>23 cases where it is predicted that the seller</p> <p>24 inadvertently set them too low; correct?</p> <p>25 A. Correct.</p>	<p style="text-align: right;">Page 173</p> <p>1 are unable to optimize floor prices at all; correct?</p> <p>2 MR. COLLIER: Objection. Form.</p> <p>3 A. They couldn't optimize floor prices</p> <p>4 well.</p> <p>5 Q. But they could optimize floor prices?</p> <p>6 A. They could try to improve floor prices.</p> <p>7 But they wouldn't be able to do a very good job.</p> <p>8 Q. Do you have any empirical evidence to</p> <p>9 indicate publishers would not be able to do a very</p> <p>10 good job?</p> <p>11 A. Yes. The existence of RPO.</p> <p>12 Q. Could you explain what you mean by that</p> <p>13 statement?</p> <p>14 A. As I explained in my report, if the</p> <p>15 publishers could optimize floor prices well, RPO</p> <p>16 would not have an effect.</p> <p>17 Q. And RPO helped publishers optimize their</p> <p>18 floor prices; correct?</p> <p>19 MR. COLLIER: Objection. Form.</p> <p>20 A. RPO increased floor prices, but it</p> <p>21 didn't necessarily set them in a way that sellers</p> <p>22 would want them to be set.</p> <p>23 Q. Higher floor prices lead to more</p> <p>24 publisher revenue; correct?</p> <p>25 MR. COLLIER: Objection. Form.</p>

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<p style="text-align: right;">Page 174</p> <p>1 A. Sometimes it does and sometimes it 2 doesn't. Because if the floor prices get set too 3 high, then there's no auction winner. And if the 4 floor prices are set for different buyers 5 differently, then you might -- then the floor 6 prices might exclude some buyers that the publisher 7 would -- higher quality buyers. 8 Q. If RPO is able to improve publisher 9 revenue by, say, 1 to 2 percent, does that mean 10 publishers couldn't do a very good job optimizing 11 floor prices? 12 MR. COLLIER: Objection. Form. 13 A. I couldn't possibly agree with that, 14 because RPO didn't even operate on all the 15 advertisers. Right? Google's own advertisers were 16 excluded from RPO. 17 So there's no way I could agree that, 18 oh, well, the publisher gets 1 to 2 percent more 19 money; therefore, the publisher is happier. 20 Like, it's not clear to me that that 21 would be true. 22 Q. Do you have a sense of the magnitude of 23 increases in publisher floor prices that resulted 24 from RPO? 25 A. Let's see. What statistics could I give</p>	<p style="text-align: right;">Page 176</p> <p>1 and by what magnitude? 2 A. It's clear that RPO led to an increase 3 in reserve prices. The magnitudes would be very 4 different for different auctions, and I wouldn't 5 know how to aggregate all of that. 6 Q. Did you investigate the magnitude of 7 increases in reserve prices on average across 8 auctions? 9 A. So again, I don't really know how to 10 compute that average because, again, it's an 11 aggregate, so I'm not really sure whether to do 12 that. But I'm also not sure that that calculation 13 would necessarily help me form my opinions. 14 Q. Would it make a difference to your 15 opinion if RPO increased publisher floor prices by 16 0.1 percent or increased publisher floor prices by 17 10 percent? 18 A. The amount that the floor prices -- the 19 percentage that the floor prices themselves 20 increase is not as relevant as the statistics that 21 are actually in my report. 22 Q. So your testimony is that the amount 23 that the floor prices themselves increase is not as 24 relevant to your opinion on reserve price 25 optimization; is that correct?</p>
<p style="text-align: right;">Page 175</p> <p>1 you that would satisfy this question? 2 I know we have a bunch of statistics 3 about RPO in the report, but I don't know if any of 4 them will satisfy what you're looking for. I will 5 keep looking. 6 Sorry. So you're asking for the 7 magnitude at which RPO increased floor prices; 8 right? 9 Q. Yeah, I can repeat my question. 10 Do you have a sense of the magnitude of 11 increases in publisher floor prices that resulted 12 from RPO? 13 A. One of the challenges with that is that 14 the auctions are all different scales, so I don't 15 really know how to answer it. 16 Q. Before you provided an opinion in your 17 report on the impact of RPO, did you investigate 18 this question? 19 MR. COLLIER: Objection. Form. 20 A. It's not clear that investigating this 21 question makes any sense, because the question 22 doesn't make any sense. 23 Q. Your testimony is that it does not make 24 sense to investigate whether reserve price 25 optimization led to an increase in reserve prices</p>	<p style="text-align: right;">Page 177</p> <p>1 MR. COLLIER: Objection. Form. 2 A. I said the statistics in my report were 3 more informative. 4 Q. So your opinion is that statistics on 5 the amount that floor prices increased under reserve 6 price optimization is not informative; is that 7 correct? 8 A. That's not what I said. I said that 9 what's in my report is more informative than 10 knowing how much RPO adjusted the floor price for 11 any particular auction. Or an average across 12 auctions, however one calculation that average. 13 Q. Did you calculate such an average? 14 A. As I mentioned, I had sufficient 15 information to construct the opinions in my report, 16 and creating a calculation that wouldn't -- it 17 wouldn't make my report stronger to have done that 18 particular calculation. 19 Q. Just going back to how RPO works, RPO 20 set a floor price for the publisher; correct? 21 A. Yes. 22 Q. And the publisher was able to increase 23 the floor price above the RPO set floor price; 24 correct? 25 A. I'm sorry, if RPO is a secret program,</p>

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<p style="text-align: right;">Page 178</p> <p>1 how would the publisher be able to -- they could</p> <p>2 set the floor price -- I don't understand what you</p> <p>3 are saying.</p> <p>4 The publisher doesn't know what RPO is</p> <p>5 doing. Therefore, there's no way the publisher</p> <p>6 could have seen the floor price from RPO and then</p> <p>7 adjusted their floor price above it if the program</p> <p>8 is hidden. So I don't really understand your</p> <p>9 question.</p> <p>10 Q. The question is if RPO set a price floor</p> <p>11 of, for example, \$1, and the publisher set a manual</p> <p>12 price floor of, say, \$2, nothing in the RPO program</p> <p>13 prevented the publisher from setting the \$2 floor</p> <p>14 price; correct?</p> <p>15 A. So the publisher sets the price first,</p> <p>16 and RPO doesn't lower the floor price.</p> <p>17 Q. RPO does not lower a publisher's floor</p> <p>18 price; correct?</p> <p>19 A. Correct.</p> <p>20 Q. So with RPO, Google only increased the</p> <p>21 publishers' price floors and never set the price</p> <p>22 floor lower than the publishers' set floor; correct?</p> <p>23 A. As far as I know, yes.</p> <p>24 Q. Is it your understanding that RPO used</p> <p>25 historical bid data to adjust publishers' floor</p>	<p style="text-align: right;">Page 180</p> <p>1 information you want is in my report, but I'm happy</p> <p>2 to go look at this report.</p> <p>3 Page what?</p> <p>4 Q. Paragraph 292 of Professor Hochstetler's</p> <p>5 report.</p> <p>6 MR. COLLIER: Counsel, are you only</p> <p>7 going to ask about paragraph 292?</p> <p>8 MR. HUNSBERGER: That and maybe one</p> <p>9 other paragraph, depending on where the</p> <p>10 conversation goes.</p> <p>11 MR. COLLIER: I'm trying not to</p> <p>12 have her, pursuant to my instructions, read</p> <p>13 the entire document.</p> <p>14 MR. HUNSBERGER: Paragraphs 292 and</p> <p>15 295 are the ones that may be relevant.</p> <p>16 MR. COLLIER: Dr. Rudin, you read</p> <p>17 what you need to read to answer the questions</p> <p>18 honestly. But I don't believe you have to</p> <p>19 read this whole report to deal with this, but</p> <p>20 there might be a section or context you have</p> <p>21 to look at.</p> <p>22 A. Again, I believe the information we're</p> <p>23 looking for is actually in my report. Oh, well.</p> <p>24 Q. If you're able to answer based on your</p> <p>25 own opinions, without reference to Professor</p>
<p style="text-align: right;">Page 179</p> <p>1 prices?</p> <p>2 A. I believe it did.</p> <p>3 [REDACTED]</p> <p>4 [REDACTED]</p> <p>5 A. I can't remember off the top of my head</p> <p>6 which Google model used which data. But if you</p> <p>7 point me to the section in my report, I would be</p> <p>8 happy to confirm.</p> <p>9 MR. HUNSBERGER: We can introduce</p> <p>10 another exhibit that might help you on this</p> <p>11 issue.</p> <p>12 (Exhibit 6, Opening Expert Report</p> <p>13 of Jacob Hochstetler dated June 7, 2024,</p> <p>14 marked for identification, as of this date.)</p> <p>15 BY MR. HUNSBERGER:</p> <p>16 Q. So I am handing you what has been marked</p> <p>17 for the record as Rudin Exhibit 6. This is a copy</p> <p>18 of the opening expert report submitted by</p> <p>19 plaintiffs' expert Jacob Hochstetler on June 7,</p> <p>20 2024.</p> <p>21 Professor, you cite this report in</p> <p>22 footnotes 51 and 224 in your report. I will ask you</p> <p>23 about one specific paragraph in Professor</p> <p>24 Hochstetler's report at paragraph 292.</p> <p>25 A. Okay, I do have a -- I believe the</p>	<p style="text-align: right;">Page 181</p> <p>1 Hochstetler's report, we can do that. I can repeat</p> <p>2 the question, if that would be helpful.</p> <p>3 A. Sorry. Sorry. I'm not sure what to do.</p> <p>4 Maybe I will just read --</p> <p>5 Q. 292 is the first --</p> <p>6 A. 292. Okay. Will you give me a minute</p> <p>7 to look at my report as well?</p> <p>8 Q. Yes.</p> <p>9 A. Okay. I'll go back to reading here.</p> <p>10 I'm sorry, what was the other paragraph you wanted</p> <p>11 me to read?</p> <p>12 Q. 292 and 295.</p> <p>13 A. Okay.</p> <p>14 Q. So looking at Professor Hochstetler's</p> <p>15 report, paragraph 292, do you see the sentence that</p> <p>16 starts -- at the very first sentence, I apologize.</p> <p>17 The very first sentence of paragraph 292 states,</p> <p>18 "More specifically, [REDACTED]</p> <p>19 [REDACTED]</p> <p>20 [REDACTED]</p> <p>21 [REDACTED]</p> <p>22 [REDACTED]</p> <p>23 Do you see that?</p> <p>24 A. Yes.</p> <p>25 Q. Do you see at the very top of this</p>

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1 page 146 the heading that refers to "Second-Price
2 RPO"?
3 A. Yes.
4 Q. "Second-price RPO raised auction floors
5 on a per-buyer basis using historical AdX option
6 data"?
7 A. Yes.
8 Q. Do you agree with Professor Hochstetler
9 that [REDACTED]
10 [REDACTED]
11 A. Yes. I mean, you also of course want to
12 look at the fact that there's another version right
13 below it that talks about cookies and using
14 additional cookie data as well. So this is not the
15 only data that's ever used. I just want to point
16 that out.
17 Q. We can go to paragraph 295, which the
18 second sentence of 295 reads, "[REDACTED]
19 [REDACTED]
20 [REDACTED]
21 [REDACTED]
22 [REDACTED]"
23 Do you see that?
24 A. Yes.
25 Q. So do you agree that RPO in both

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1 versions was [REDACTED]
2 [REDACTED]?
3 A. I will say this: The models were based
4 on the previous day's data. The whole formation of
5 the problem, the whole setup, everything, is based
6 on every -- things that were created in the past,
7 leveraging Google's long-term knowledge of how to
8 do this.
9 Q. But under RPO, [REDACTED]
10 [REDACTED]; correct?
11 A. So, again, yes, Google used the previous
12 day's data to estimate the floor price, as well as
13 its long-term information about how to do this and,
14 you know, the ability to place the cookies on the
15 website, all of that -- you know, I couldn't go in
16 and use yesterday's data to create this model. It
17 wouldn't be possible without the whole setup.
18 Q. And you were flipping through your
19 report before when I asked this question.
20 Do you offer any opinion in your report
21 about the number of days of data that RPO is
22 trained on?
23 A. I think so, but I can't find it. But
24 one day seems reasonable.
25 Q. In connection with forming your opinion

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1 in this case, did you investigate the number of days
2 of data that RPO is trained on?
3 MR. COLLIER: Objection. Form.
4 A. I did. I just can't remember it
5 because, again, I read thousands and thousands of
6 pages, and this report alone is -- what -- 90 pages
7 or something. So I just don't remember off the top
8 of my head.
9 Q. If we look at paragraph 184 of your
10 report, you state that, in the third sentence,
11 "Google could use the combined DFP-AdX information
12 to leverage all seller and buyer data to optimize
13 floor prices."
14 Do you see that?
15 A. Yes.
16 Q. And in the next sentence you claim that
17 this is a "massive amount of valuable data."
18 Do you see that?
19 A. Yes.
20 Q. You offer an opinion on the data that
21 Google actually did use to optimize floor prices?
22 A. I would refer to the report you just
23 handed me for that kind of information, as well as
24 whatever citations I have in my report.
25 Q. If we turn to paragraph 186 of your

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1 report on RPO, you state in paragraph 186, the first
2 sentence, "The key to RPO's success was its secrecy.
3 RPO remained secret for one year after launch (and
4 remained obscured afterwards due to Google's
5 throttling efforts and failure to disclose RPO's
6 precise rules), which had the effect of preventing
7 sellers from undermining it."
8 Do you see that paragraph?
9 A. Yes.
10 Q. Is it your opinion that RPO was not
11 disclosed with sufficient detail?
12 A. Correct.
13 Q. And in paragraph 184 you say that
14 "Sellers could not optimize per-buyer floor prices
15 well, as they did not have enough data"; correct?
16 A. Correct.
17 Q. And in that same paragraph you say that
18 sellers could not get the same amount of data as
19 Google could with DFP and AdX; correct?
20 A. Correct.
21 Q. And this data discrepancy between Google
22 and publishers prevented publishers from optimizing
23 their floor prices effectively; is that correct?
24 A. That's an important reason, yes.
25 Q. And in paragraph 187 of your report you

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<p>1 say that RPO changed the distribution of winning</p> <p>2 bids that the publishers observed; correct?</p> <p>3 A. Correct.</p> <p>4 Q. And RPO changes the distribution of</p> <p>5 winning bids by increasing the price floors beyond</p> <p>6 what publishers had set; correct?</p> <p>7 A. Yes, for some auctions.</p> <p>8 Q. If Google fully disclosed the details of</p> <p>9 RPO, is it your opinion that Google would still have</p> <p>10 a data advantage over publishers?</p> <p>11 MR. COLLIER: Objection. Form.</p> <p>12 A. Yes.</p> <p>13 Q. Because sellers compete with each other</p> <p>14 and would not want to share their data; correct?</p> <p>15 A. That's one reason, but there's a whole</p> <p>16 lot more data that Google has that publishers don't</p> <p>17 have.</p> <p>18 Q. And because sellers don't have access to</p> <p>19 data from all auctions in AdX; correct?</p> <p>20 MR. COLLIER: Objection. Form.</p> <p>21 A. That's some of the data that publishers</p> <p>22 don't have, yes.</p> <p>23 Q. If I understand correctly, your opinion</p> <p>24 is that RPO would still increase variance for</p> <p>25 sellers even if Google had disclosed RPO's rules?</p>	<p>1 MR. HUNSBERGER: This is actually a</p> <p>2 good breaking point that we can take break.</p> <p>3 THE VIDEOGRAPHER: Going off the</p> <p>4 record. The time is 4:21 p.m.</p> <p>5 (Recess taken.)</p> <p>6 THE VIDEOGRAPHER: Going back on</p> <p>7 the record. The time is 4:52 p.m.</p> <p>8 BY MR. HUNSBERGER:</p> <p>9 Q. Professor Rudin, I would like to turn</p> <p>10 our attention to another optimization that you</p> <p>11 discuss in your report, dynamic revenue share, which</p> <p>12 you and others abbreviate as "DRS."</p> <p>13 And if I refer to dynamic revenue share</p> <p>14 as "DRS," will you understand I mean to refer to the</p> <p>15 sell-side DRS program?</p> <p>16 A. Yes.</p> <p>17 Q. At a high level could you summarize for</p> <p>18 me your understanding of how DRS functions?</p> <p>19 A. So DRS is a program where Google adjusts</p> <p>20 its take rate for different auctions.</p> <p>21 Q. If we take a look at your report at</p> <p>22 paragraph 173, you say that "Google launched</p> <p>23 sell-side DRS to increase auction wins in AdX when</p> <p>24 bids from AdX winners would be below the floor</p> <p>25 price."</p>
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<p>1 A. Yes. RPO affected some auctions and not</p> <p>2 others. It affected some buyers and not others.</p> <p>3 So yes.</p> <p>4 Q. So under the framework that you</p> <p>5 described in your report, if Google had disclosed</p> <p>6 all the details of RPO, publishers and advertisers</p> <p>7 still would not have been able to undermine RPO;</p> <p>8 correct?</p> <p>9 A. I'm sorry, I didn't understand the</p> <p>10 question.</p> <p>11 Q. Under the framework for the opinions</p> <p>12 that you describe in your report, if Google had</p> <p>13 disclosed all the details of RPO, would publishers</p> <p>14 and advertisers have been able to effectively</p> <p>15 respond to RPO?</p> <p>16 A. Are they providing the data as well? Or</p> <p>17 just disclosing that the program exists and how it</p> <p>18 works?</p> <p>19 Q. Disclosures.</p> <p>20 MR. COLLIER: Objection. Form.</p> <p>21 Go ahead.</p> <p>22 A. No, because they didn't have the data.</p> <p>23 THE WITNESS: Can we take a break</p> <p>24 at some point? It doesn't have to be right</p> <p>25 now.</p>	<p>1 Do you see that language?</p> <p>2 A. Yes.</p> <p>3 Q. Do you agree that in an auction if all</p> <p>4 the bids are below the floor price the auction would</p> <p>5 not clear?</p> <p>6 A. The auction would not clear in AdX, yes.</p> <p>7 It might go to another auctioneer.</p> <p>8 Q. And in another auction other than AdX,</p> <p>9 if all the bids in that auction are below the</p> <p>10 publisher's floor prices in that auction, the</p> <p>11 transaction would also not clear; correct?</p> <p>12 A. Correct. If all the bids are below the</p> <p>13 floor price, the auction typically does not clear.</p> <p>14 Q. And in the last sentence of paragraph</p> <p>15 173 you state that "Sometimes the subsidies are used</p> <p>16 to permit a bid to clear a floor."</p> <p>17 Do you see that?</p> <p>18 A. Yes.</p> <p>19 Q. Do you agree that if a bid clears the</p> <p>20 price floor, that leads to winning the auction?</p> <p>21 A. Yes.</p> <p>22 Q. So if Google subsidizes the bids to</p> <p>23 clear price floors, that benefits the buyer who made</p> <p>24 the highest bid; correct?</p> <p>25 MR. COLLIER: Objection. Form.</p>

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<p style="text-align: right;">Page 190</p> <p>1 A. Not necessarily. Because the buyer --</p> <p>2 if you're talking about, you know, DRSv2, they have</p> <p>3 to pay it back. And so this is not necessarily</p> <p>4 what the advertiser wants and it's not necessarily</p> <p>5 what the publisher would want.</p> <p>6 Q. But you agree that with the subsidy the</p> <p>7 buyers wins an impression that it would not have won</p> <p>8 without the subsidy; correct?</p> <p>9 A. In AdX, yes. So if the buyer was given</p> <p>10 a subsidy they would have to pay back later, they</p> <p>11 would win that auction, yeah.</p> <p>12 Q. But in the auction with a subsidy, the</p> <p>13 buyers wins an impression that it would not have won</p> <p>14 without the subsidy; correct?</p> <p>15 A. So again, the buyer, yes, would win that</p> <p>16 auction and would have to pay the subsidy back</p> <p>17 later in another auction.</p> <p>18 Q. Do you also agree that without the</p> <p>19 subsidy from Google the publisher would not have</p> <p>20 received anything from Google because the auction</p> <p>21 would not have cleared?</p> <p>22 A. So the publisher would not have had the</p> <p>23 auction clear in AdX. The publisher may have had</p> <p>24 the auction clear the next auctioneer with a</p> <p>25 different set of buyers bidding differently in a</p>	<p style="text-align: right;">Page 192</p> <p>1 Q. Professor Rudin, if I understand</p> <p>2 correctly, you expressed four concerns about DRS. I</p> <p>3 would like to review them now and discuss them one</p> <p>4 by one to make sure I understand each of the</p> <p>5 concerns.</p> <p>6 First, by adjusting the AdX revenue</p> <p>7 share, DRS introduces additional bid variance,</p> <p>8 making it harder for customers to use the results to</p> <p>9 build machine-learning models.</p> <p>10 Is that a fair summary of your concern?</p> <p>11 MR. COLLIER: I apologize. Are you</p> <p>12 reading from a paragraph you want her to --</p> <p>13 MR. HUNSBERGER: I'm just looking</p> <p>14 at my outline.</p> <p>15 MR. COLLIER: My apologies. We</p> <p>16 were both looking to go to the paragraph.</p> <p>17 That's how I understood your question. My</p> <p>18 apologies.</p> <p>19 A. So what you expressed is a good summary</p> <p>20 of my point in 4 on page 60.</p> <p>21 Q. That's paragraph 177?</p> <p>22 A. Starting there, yes.</p> <p>23 Q. Your second concern is that DRS can in</p> <p>24 some cases change the winner of an impression; is</p> <p>25 that correct?</p>
<p style="text-align: right;">Page 191</p> <p>1 different situation, different auction rules,</p> <p>2 whatever.</p> <p>3 Q. So just to be clear for the record,</p> <p>4 without the subsidy from Google, the publisher would</p> <p>5 not have received anything from Google resulting</p> <p>6 from the AdX auction because the AdX auction would</p> <p>7 not have cleared; is that correct?</p> <p>8 A. That's not necessarily correct. Because</p> <p>9 if the impression doesn't clear, if the auction</p> <p>10 doesn't clear in AdX, it might go to another</p> <p>11 auctioneer, and there be Google bidders into that</p> <p>12 auction and they might win that auction, so Google</p> <p>13 might end up giving the publisher something in that</p> <p>14 way.</p> <p>15 So it's not real clear that the answer</p> <p>16 to your question is yes, because there could be</p> <p>17 circumstances in which Google still pays that</p> <p>18 publisher, or at least Google advertisers still pay</p> <p>19 that publisher.</p> <p>20 Q. Do you analyze how often that happens in</p> <p>21 your report?</p> <p>22 A. We do -- I do address things related to</p> <p>23 that. I'm not sure if I would be able to present</p> <p>24 you a statistic that's exactly what you're looking</p> <p>25 for.</p>	<p style="text-align: right;">Page 193</p> <p>1 A. Yes.</p> <p>2 Q. Your third concern, as I understand it,</p> <p>3 is that if sellers had known about DRS, they would</p> <p>4 have responded by raising their floor prices, but</p> <p>5 without knowledge of when DRS would apply they could</p> <p>6 not do so; is that correct?</p> <p>7 A. Yes, that's definitely a concern.</p> <p>8 Q. And fourth, if buyers had known about</p> <p>9 DRS, they would have shaded some of their bids</p> <p>10 differently or withheld their bids altogether, but</p> <p>11 without knowledge of when DRS would apply, they</p> <p>12 could not do so.</p> <p>13 Is that a fair summary of your fourth</p> <p>14 concern?</p> <p>15 A. That's a fair summary of my concern.</p> <p>16 Maybe you can show me where that is if you're</p> <p>17 looking in here, but that definitely agrees with</p> <p>18 something I placed in here.</p> <p>19 Q. Do you express any other concerns other</p> <p>20 than those four regarding DRS, its implementation or</p> <p>21 its effects?</p> <p>22 A. There is things about DRS throughout</p> <p>23 this entire report.</p> <p>24 Q. Do they touch on issues other than the</p> <p>25 four we just discussed?</p>

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<p style="text-align: right;">Page 194</p> <p>1 MR. COLLIER: Object. Form.</p> <p>2 A. I would have to go through the report to</p> <p>3 figure out if there are any additional concerns.</p> <p>4 And DRS feeds into all of these things.</p> <p>5 So when you say is your opinions limited</p> <p>6 to this, I would say my opinions have everything</p> <p>7 sort of tied together as well. So it's hard for me</p> <p>8 to sort of say it's limited to this. That's not --</p> <p>9 yeah. It's not a good representation.</p> <p>10 Q. Is it fair to say that the four concerns</p> <p>11 I just summarized are the most important concerns</p> <p>12 you have about DRS?</p> <p>13 A. Those are important concerns about DRS.</p> <p>14 Q. Are any of your other concerns as</p> <p>15 important as those four?</p> <p>16 A. Well, as I mentioned, DRS feeds into</p> <p>17 this whole pipeline, this whole snowball that I</p> <p>18 mentioned. So, you know, it's hard to sort of</p> <p>19 value which is most important, which is least</p> <p>20 important.</p> <p>21 I will just say that, you know, I've</p> <p>22 mentioned DRS throughout my entire report, so --</p> <p>23 yeah.</p> <p>24 Q. Okay. If we talk for a little bit about</p> <p>25 variance, is it fair to say increased bid variance</p>	<p style="text-align: right;">Page 196</p> <p>1 So the question is would the bids have a</p> <p>2 larger spread in real-time bidding as they would in</p> <p>3 header bidding, and I don't know the answer to</p> <p>4 that, and it's probably auction dependent.</p> <p>5 Q. Do you have any opinion in this case on</p> <p>6 the benefits of real-time bidding?</p> <p>7 A. In general I don't have opinions on the</p> <p>8 benefits of one type of bidding over another type</p> <p>9 of bidding, if that's what you're asking.</p> <p>10 Q. Okay. We can move on.</p> <p>11 Turning to the next concern, you have an</p> <p>12 opinion that DRS can change the winner of an</p> <p>13 auction; is that correct?</p> <p>14 A. Yes.</p> <p>15 Q. Can you explain how that would occur?</p> <p>16 A. Yes. So if one bidder gets a subsidy,</p> <p>17 then that might increase their bid and push them</p> <p>18 over either the highest bidder -- the highest other</p> <p>19 bidder or the floor.</p> <p>20 Q. And assuming that what you described</p> <p>21 took place, how would that harm the publisher?</p> <p>22 A. There's many different ways that it</p> <p>23 would harm the publisher, as I've listed in my</p> <p>24 report. I will give you some examples.</p> <p>25 So maybe the bidder who gets the subsidy</p>
<p style="text-align: right;">Page 195</p> <p>1 can be a consequence of product innovation?</p> <p>2 A. I am not an expert in product innovation</p> <p>3 and what constitutes innovation. That's not part</p> <p>4 of my expertise, so I think I'll not be able to</p> <p>5 answer that one.</p> <p>6 Q. Any new product innovation would</p> <p>7 increase the degrees of freedom; correct?</p> <p>8 MR. COLLIER: Objection. Form.</p> <p>9 A. That question doesn't make any sense to</p> <p>10 me. You can have innovations that don't increase</p> <p>11 variance. I just can't agree with that.</p> <p>12 Q. So, for example, are you aware of the</p> <p>13 innovation in ad tech known as real-time bidding?</p> <p>14 A. Yes.</p> <p>15 Q. And real-time bidding often has more</p> <p>16 variance than a static bidding model; is that</p> <p>17 correct?</p> <p>18 A. I can't weigh any judgment on that one.</p> <p>19 I would need --</p> <p>20 Q. No view on that question?</p> <p>21 A. I would have to look at it, and I -- I</p> <p>22 don't recall my report having anything about</p> <p>23 that -- about that, you know, whether variance</p> <p>24 of -- let me interpret the question more narrowly.</p> <p>25 Right?</p>	<p style="text-align: right;">Page 197</p> <p>1 is a lower quality advertiser who now wins the bid</p> <p>2 because they got a subsidy, and so the publisher</p> <p>3 now has a lower quality advertisement on their</p> <p>4 site.</p> <p>5 Also, DRS makes it very -- increases the</p> <p>6 variance of all the bids because Google is changing</p> <p>7 the bids away from their valuations, so it makes it</p> <p>8 harder to do any kind of estimation by buyers or</p> <p>9 sellers.</p> <p>10 Those are good examples I think.</p> <p>11 Q. Did you investigate, in connection with</p> <p>12 forming your opinions, whether DRS in fact led to</p> <p>13 lower quality advertisements being shown on</p> <p>14 publisher sites?</p> <p>15 A. I believe I saw something about that.</p> <p>16 It's the same effect with Bernanke as well, and</p> <p>17 this is discussed extensively in other reports, and</p> <p>18 I can't remember where in my report it's discussed,</p> <p>19 but it's definitely discussed.</p> <p>20 Q. Focusing specifically on the opinions in</p> <p>21 your report, do you offer any empirical analysis</p> <p>22 that DRS in fact led to lower quality advertisements</p> <p>23 being shown on publisher sites?</p> <p>24 MR. COLLIER: Objection. Form.</p> <p>25 A. I have seen documents to that extent. I</p>

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<p>Page 198</p> <p>1 just don't know if they're cited anywhere I can</p> <p>2 reach within a short amount of time.</p> <p>3 Q. Did you investigate whether Google Ad</p> <p>4 Exchange had lower quality buyers than other ad</p> <p>5 exchanges?</p> <p>6 A. I definitely saw documents that state</p> <p>7 that. Again, it would take me a few minutes to</p> <p>8 find those documents.</p> <p>9 Would you like me to try and do that?</p> <p>10 Q. No.</p> <p>11 Is it your opinion in this case that</p> <p>12 Google's Ad Exchange has lower quality buyers than</p> <p>13 other ad exchanges?</p> <p>14 A. I've seen documents that state that.</p> <p>15 Q. Is it your opinion that that is in fact</p> <p>16 true?</p> <p>17 A. As I mentioned, I've seen internal</p> <p>18 documents that state that, and it's addressed</p> <p>19 extensively in other reports.</p> <p>20 Q. My question is whether you're offering</p> <p>21 that as an opinion in this case, that Google's Ad</p> <p>22 Exchange has lower quality buyers than other ad</p> <p>23 exchanges?</p> <p>24 A. As I said, that's not something</p> <p>25 addressed necessarily directly in a place where I</p>	<p>Page 200</p> <p>1 revenue?</p> <p>2 A. Yeah, that's a fair description.</p> <p>3 Q. Are you familiar with the concept in</p> <p>4 economics known as moral hazard?</p> <p>5 A. Only very vaguely.</p> <p>6 Q. If we accept -- if we adopt the</p> <p>7 definition of moral hazard from Oxford that the lack</p> <p>8 of incentive to guard against risk where one is</p> <p>9 protected from its consequences, is it fair to say</p> <p>10 Google would have created a form of moral hazard by</p> <p>11 encouraging that behavior by publishers?</p> <p>12 MR. COLLIER: Object. Form.</p> <p>13 A. I'm sorry, I'm not familiar enough with</p> <p>14 this term that I can apply it fluently to new</p> <p>15 situations.</p> <p>16 Q. That's fair. We can move on.</p> <p>17 In our case, Google did not apply DRS to</p> <p>18 every transaction; correct?</p> <p>19 A. Correct.</p> <p>20 Q. [REDACTED]</p> <p>21 [REDACTED]</p> <p>22 [REDACTED]</p> <p>23 A. [REDACTED]</p> <p>24 Q. [REDACTED]</p> <p>25 [REDACTED]</p>
<p>Page 199</p> <p>1 can find it, but it is addressed in other reports</p> <p>2 that are referenced here (indicating). And reports</p> <p>3 that are not referenced here as well.</p> <p>4 Q. The last -- the third and fourth</p> <p>5 concerns that we discussed earlier relate to how</p> <p>6 advertisers and publishers could have changed their</p> <p>7 behavior if they had known about DRS; is that fair?</p> <p>8 A. Is what fair?</p> <p>9 Q. Is that a fair summary, that the third</p> <p>10 and fourth concerns that we discussed are about how</p> <p>11 advertisers and publishers could have changed their</p> <p>12 behavior if they had known about DRS?</p> <p>13 A. I believe so, but it was a few minutes</p> <p>14 ago and I can't remember everything we said a few</p> <p>15 minutes ago.</p> <p>16 Q. And you suggest in your report that if</p> <p>17 the publisher knew that Google was reducing its</p> <p>18 revenue share to allow bids to clear floor prices</p> <p>19 that they otherwise wouldn't clear, the publisher</p> <p>20 might have further increased its floor price;</p> <p>21 correct?</p> <p>22 A. Correct.</p> <p>23 Q. That's because the publisher no longer</p> <p>24 has to worry about setting the floor price too high</p> <p>25 if Google will save it by reducing its share of the</p>	<p>Page 201</p> <p>1 [REDACTED]</p> <p>2 A. [REDACTED]</p> <p>3 [REDACTED]</p> <p>4 [REDACTED]</p> <p>5 Q. And that's a rational goal for a</p> <p>6 profit-maximizing company like Google; correct?</p> <p>7 MR. COLLIER: Objection. Form.</p> <p>8 A. I'm not going to weigh in on what's</p> <p>9 rational and not rational.</p> <p>10 Q. That's a reasonable thing for a company</p> <p>11 like Google to do; right?</p> <p>12 MR. COLLIER: Objection. Form.</p> <p>13 A. I'm not going to weigh in on what's</p> <p>14 reasonable and unreasonable.</p> <p>15 Q. You don't have a view in this case on</p> <p>16 whether Google's decisions were reasonable or</p> <p>17 unreasonable?</p> <p>18 MR. COLLIER: Objection. Form.</p> <p>19 A. I'm not going to weigh in on applying</p> <p>20 the word "reasonable" to various decisions that</p> <p>21 various entities made.</p> <p>22 Q. Including Google?</p> <p>23 A. Including Google.</p> <p>24 Q. Turning back to [REDACTED]</p> <p>25 [REDACTED]</p>

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1 [REDACTED]
2 [REDACTED]
3 [REDACTED]
4 [REDACTED]
5 MR. COLLIER: Objection. Form.
6 A. [REDACTED]
7 [REDACTED]
8 [REDACTED]
9 [REDACTED]
10 [REDACTED]
11 [REDACTED]
12 [REDACTED]
13 [REDACTED]
14 [REDACTED]
15 [REDACTED]
16 Q. [REDACTED]
17 [REDACTED]
18 [REDACTED]
19 [REDACTED]
20 [REDACTED]
21 A. [REDACTED]
22 [REDACTED]
23 Q. [REDACTED]
24 [REDACTED]
25 A. [REDACTED]

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1 [REDACTED]
2 [REDACTED]
3 [REDACTED]
4 [REDACTED]
5 [REDACTED]
6 [REDACTED]
7 [REDACTED]
8 THE WITNESS: Can we take a break
9 in few minutes?
10 MR. HUNSBERGER: If you would like
11 to take a break, we can take a break.
12 THE VIDEOGRAPHER: Going off the
13 record. The time is 5:16 p.m.
14 (Recess taken.)
15 THE VIDEOGRAPHER: Going back on
16 the record. The time is 5:29 p.m.
17 BY MR. HUNSBERGER:
18 Q. Professor Rudin, I would like to take a
19 step back and talk a little bit about auctions
20 generally.
21 Is it your understanding that in a
22 second-price auction the highest bidder pays the
23 greater of the reserve price and the second highest
24 bid?
25 A. Yes.

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1 Q. And is it your understanding that
2 despite paying the amount of the second highest bid,
3 the highest bidder still wins the auction; correct?
4 A. Yes.
5 Q. I would like to go through a
6 hypothetical in a world without DRS and a world with
7 DRS.
8 So in Scenario 1 let's imagine a
9 scenario where the publisher's reserved price is
10 \$10, the highest bid in AdX is \$11, the second
11 highest bid is \$10.50, and the AdX revenue share is
12 fixed at 20 percent.
13 A. You seem to think I can do math in my
14 head. Whoa.
15 MR. COLLIER: I don't think he'll
16 object if you have paper and pen.
17 Q. That's fine. Go ahead. You can write
18 it down if that helps.
19 A. We're five hours in. I don't know.
20 Q. Do you want me to repeat the
21 assumptions?
22 A. You can give me a pencil and paper, but,
23 I mean, I don't know if I'm going to be able to
24 follow all your calculations. I don't know where
25 you're going with them. I'm just warning you.

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1 Q. Okay. Do you want paper and pen?
2 A. Might as well --
3 MR. COLLIER: Would you prefer
4 that, or would you like to have in front of
5 you his question?
6 You'll object to that.
7 MR. HUNSBERGER: If that's the
8 realtime, you can have the realtime in front.
9 MR. COLLIER: I can put in front of
10 you this device where, when he says the
11 question, it gets typed out and you can refer
12 to it.
13 THE WITNESS: We'll do both.
14 MR. COLLIER: Mr. Hunsberger, is
15 that okay? I don't want to do anything you
16 don't approve of.
17 MR. HUNSBERGER: That's okay.
18 A. But I can't do things like calculate 20
19 percent of random -- whatever number you give me on
20 the fly.
21 MR. STEINTHAL: We kept the numbers
22 close to 10.
23 MR. COLLIER: Russell got in the
24 record now.
25 BY MR. HUNSBERGER:

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<p style="text-align: right;">Page 206</p> <p>1 Q. So can I start at the top.</p> <p>2 Scenario 1 is a scenario where the</p> <p>3 publisher's reserve price is \$10. The highest bid</p> <p>4 in AdX is \$11. The second highest bid in AdX is</p> <p>5 10.50. And the AdX revenue share is a fixed 20</p> <p>6 percent.</p> <p>7 A. Okay.</p> <p>8 Q. Do you agree that with a revenue share</p> <p>9 of 20 percent, none of the bids would clear the</p> <p>10 floor price?</p> <p>11 A. Sure doesn't look that way.</p> <p>12 Q. If we go now to Scenario 2, this is a</p> <p>13 world where there is DRS in place. The same facts</p> <p>14 apply that we just discussed. The publisher's</p> <p>15 reserve price is \$10, the highest bid in AdX is \$11,</p> <p>16 and the second highest bid in AdX is 10.50.</p> <p>17 A. What's the revenue share?</p> <p>18 Q. This time AdX dynamically applied a 9.1</p> <p>19 percent revenue share to the highest bid.</p> <p>20 With that revenue share, the net bid</p> <p>21 would be \$10 here; correct?</p> <p>22 A. You want me to calculate 9.1 percent of</p> <p>23 something on the fly? Sorry. That's beyond my</p> <p>24 capabilities.</p> <p>25 Q. If I represent to you that the revenue</p>	<p style="text-align: right;">Page 208</p> <p>1 the highest.</p> <p>2 Q. With dynamic revenue share why does only</p> <p>3 one of the bids go up?</p> <p>4 MR. COLLIER: Objection. Form.</p> <p>5 A. Google determines which bids go up.</p> <p>6 It's whichever bid is subsidized.</p> <p>7 Q. So if Google applies dynamic revenue</p> <p>8 share to two bids in an auction, it wouldn't</p> <p>9 necessarily change the identity of the winner;</p> <p>10 correct?</p> <p>11 A. It depends on the auction and what --</p> <p>12 the way Google applies dynamic revenue share. So</p> <p>13 it wouldn't necessarily -- dynamic revenue share</p> <p>14 wouldn't necessarily change the winner. It might</p> <p>15 change the winner.</p> <p>16 Q. So returning to your report,</p> <p>17 paragraph 179.</p> <p>18 Are you there?</p> <p>19 A. Yes.</p> <p>20 Q. You say in paragraph 179 that Professor</p> <p>21 Milgrom does not consider the competing candidate</p> <p>22 variable in Figure 14. Is that right?</p> <p>23 A. That's right.</p> <p>24 Q. And then in footnote 157 you write -- in</p> <p>25 the second sentence after the citation you write,</p>
<p style="text-align: right;">Page 207</p> <p>1 share of 9.1 percent applied to the second highest</p> <p>2 bid results in a net bid of \$10, can we accept that?</p> <p>3 A. Yeah -- I could accept your calculation.</p> <p>4 That's fine.</p> <p>5 Q. So with the \$10 bid and the 9.1</p> <p>6 percent --</p> <p>7 A. With a \$10 bid? I'm sorry, I thought it</p> <p>8 was an \$11 bid and then a \$10.50 bid?</p> <p>9 Q. Let's take a step back. I may have made</p> <p>10 an error in my math as well.</p> <p>11 So the point -- the 9.1 percent revenue</p> <p>12 share, when that's applied to the highest bid of</p> <p>13 \$11 --</p> <p>14 A. I'm sorry. Why are you applying the</p> <p>15 revenue share to the top bid if it's a second-price</p> <p>16 auction?</p> <p>17 Q. Let's abandon the math. I apologize for</p> <p>18 that painful experience.</p> <p>19 Is it your opinion that DRS could result</p> <p>20 in changing the winner of an auction on AdX?</p> <p>21 A. Yes.</p> <p>22 Q. Could you explain how that happens, in</p> <p>23 your opinion?</p> <p>24 A. So if the revenue share is less, then</p> <p>25 one of the bids can go up and that bid can become</p>	<p style="text-align: right;">Page 209</p> <p>1 "The percent of those auctions was 39 percent. (Of</p> <p>2 these DRS-manipulated auctions, two groups of them -</p> <p>3 the 'competing candidate' and 'third-party reserve'</p> <p>4 were cases where DRS changed the winner of the</p> <p>5 auction so that a lower bidder won over a higher</p> <p>6 bidder. The calculation is (1.52 plus 3.25) divided</p> <p>7 by 12.18 equals .3916. Milgrom only included the</p> <p>8 'third-party reserve' but not the 'competing</p> <p>9 candidate' auctions."</p> <p>10 Do you see that?</p> <p>11 A. Yes.</p> <p>12 MR. HUNSBERGER: I would like to</p> <p>13 introduce another exhibit that we can look at</p> <p>14 together. This is a one-page document bearing</p> <p>15 the Bates label GOOG-DOJ-13470118, and it's</p> <p>16 been marked as Rudin Exhibit 7.</p> <p>17 (Rudin Exhibit 7, Bates</p> <p>18 GOOG-DOJ-13470118, marked for identification,</p> <p>19 as of this date.)</p> <p>20 BY MR. HUNSBERGER:</p> <p>21 Q. Please take a moment to review.</p> <p>22 A. Would you be able to tell me what date</p> <p>23 this is from?</p> <p>24 Q. Professor, do you need the date to</p> <p>25 answer questions about it? If so, we can go off the</p>

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1 record.

2 A. It would be helpful.

3 THE VIDEOGRAPHER: Going off the

4 record at 5:45 p.m.

5 (Recess taken.)

6 THE VIDEOGRAPHER: Going back on

7 the record. The time is 6:02 p.m.

8 BY MR. HUNSBERGER:

9 Q. So we were talking now about document

10 GOOG-DOJ-13470118 which has been marked as Rudin

11 Exhibit 7.

12 You had asked before we took a quick

13 break the date of this document, and we have

14 confirmed in the metadata for the production, and I

15 will represent to you that the date of creation is

16 March of 2018.

17 A. Okay. Thank you.

18 MR. COLLIER: Counsel, I will make

19 an objection for the record. I don't believe

20 this is a complete document, as there appears

21 to be a reference to a PLX query and

22 CR/131764233 that are hyperlinked.

23 I'm not interrupting your

24 questioning. I'm just making my objection for

25 the record. I don't think this is complete.

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1 There's no to/from, there's no memo, there's

2 no anything.

3 That said, feel free to ask,

4 subject to my objection.

5 MR. HUNSBERGER: I understand your

6 objection, Counsel, and we reserve our rights

7 on our position in response to that.

8 BY MR. HUNSBERGER:

9 Q. Subject to that, do you see on the first

10 bullet at the top of this document refers to

11 [REDACTED]

12 A. Yes.

13 Q. And it refers to that as [REDACTED]

14 [REDACTED]

15 [REDACTED]?

16 A. Yes.

17 MR. HUNSBERGER: If we could turn

18 to another document, and this is a document

19 you said in your report. This is a document

20 bearing the Bates number

21 GOOG-AT-MDL-007375273. It's been marked as

22 Rudin Exhibit 8 for the record.

23 (Rudin Exhibit 8, Bates

24 GOOG-AT-MDL-007375273, marked for

25 identification, as of this date.)

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1 BY MR. HUNSBERGER:

2 Q. This document you cite in your report in

3 footnotes 157 to 159 for reference.

4 Please take a moment to review it, and

5 we can proceed when you're ready.

6 A. Okay.

7 Q. In footnote 157 you state that the

8 competing candidate includes cases where DRS changed

9 the winner of the auction.

10 Do you see that?

11 A. Yes.

12 Q. What is the basis for that statement?

13 A. The basis is exactly what you read; that

14 competing candidate is the price set by the bid

15 submitted by other buyer or the same buyer in the

16 case of GDN, who submits two bids from two

17 different internal buyers.

18 Q. If the other buyer is in the AdX

19 auction, how could DRS change the winning buyer

20 within that AdX auction?

21 A. So DRS would give a subsidy to the -- to

22 a lower bidder to cause it to become the highest

23 bidder, and then the competing candidate who would

24 have won now simply determines the price.

25 Q. So to make sure I understand correctly,

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1 your testimony is that DRS can change the winning

2 buyer only where DRS applies a subsidy to one bid

3 within AdX but to another bid within AdX?

4 A. That's not what I said at all.

5 Q. Could you repeat the circumstances in

6 which if both the buyers are in the AdX auction how

7 could the DRS change the winning buyer within that

8 AdX auction?

9 A. So if DRS subsidizes the bid, that

10 causes that bid to be higher, and that bidder is

11 now the winner, and the second price is now

12 determined by a competing candidate or whatever

13 these other things are.

14 Q. Is your understanding that [REDACTED]

15 [REDACTED]

16 [REDACTED]?

17 MR. COLLIER: Objection. Form.

18 A. [REDACTED]

19 [REDACTED]

20 [REDACTED]

21 [REDACTED]

22 Q. In your example are you assuming that

23 Google did not apply the DRS subsidy to the lower of

24 the two bidders within AdX?

25 A. No. That's not what I said.

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<p>1 Q. If the DRS subsidy applies to both the</p> <p>2 lower bidder and the higher bidder, how could that</p> <p>3 result in DRS changing the winning buyer within that</p> <p>4 auction?</p> <p>5 A. Okay. Let's go abstractly, and you have</p> <p>6 two bidders that are subsidized at different rates,</p> <p>7 and that could reverse the order of the bids.</p> <p>8 That's possible.</p> <p>9 Q. Is it your understanding that DRS did</p> <p>10 subsidize bids at different rates?</p> <p>11 A. I don't remember the formulas for DRS.</p> <p>12 There's several different versions of DRS, so I</p> <p>13 probably shouldn't weigh in on that one.</p> <p>14 Q. Just to make sure I understand your</p> <p>15 position, the only way to flip the order of the two</p> <p>16 bids is if the subsidies are applied at different</p> <p>17 rates; is that right?</p> <p>18 A. No.</p> <p>19 Q. If the subsidy applied to both bids at</p> <p>20 the same rate, it wouldn't change the order of the</p> <p>21 winning and second-place bid; correct?</p> <p>22 A. The premise of your question makes no</p> <p>23 sense to me, because it would be -- just to make</p> <p>24 sure I understand. You have two bidders, and you</p> <p>25 want to raise both of their bids; right? Because</p>	<p>1 advertisers could not optimize their strategies</p> <p>2 because of DRS?</p> <p>3 A. That's one of the reasons they couldn't</p> <p>4 optimize their strategies.</p> <p>5 Q. And turning to paragraph 180 of your</p> <p>6 report, you say that "Accepting Professor Weinberg's</p> <p>7 view, if the seller knew that AdX was dynamically</p> <p>8 changing the revenue share, it likely would have</p> <p>9 responded by changing its floor price."</p> <p>10 Do you see that?</p> <p>11 A. Yes.</p> <p>12 Q. Is it your opinion that DRS was not</p> <p>13 disclosed with sufficient detail?</p> <p>14 A. Correct.</p> <p>15 Q. And it's your opinion that publishers</p> <p>16 and advertisers could not optimize their strategies</p> <p>17 because of DRS in part because AdX has more accurate</p> <p>18 predictions of buyers' bids than sellers'; correct?</p> <p>19 MR. COLLIER: Object. Form.</p> <p>20 A. Well, it's the data but also the</p> <p>21 disclosure; right? If you don't know what's going</p> <p>22 on, it's very, very difficult to figure it out, and</p> <p>23 it's very difficult to respond to it.</p> <p>24 Q. And if you look at paragraph 175 of your</p> <p>25 report, the first sentence reads, "AdX knows it has</p>
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<p>1 they're both being subsidized, I assume. And then</p> <p>2 the top bidder pays the second price, which is now</p> <p>3 higher than it was before. So if Google did this,</p> <p>4 they would be charging a higher rate for the second</p> <p>5 bidder than before?</p> <p>6 Q. I don't understand your question, so let</p> <p>7 me try to phrase this in a different way.</p> <p>8 There are two bids within the AdX</p> <p>9 auction, \$5 and \$4.50. If both of those -- if those</p> <p>10 are the two highest bids in AdX and both bids</p> <p>11 receive the same subsidy from DRS, those would</p> <p>12 remain the first- and second-highest bids within</p> <p>13 AdX; correct?</p> <p>14 A. Again, I think the premise of what you</p> <p>15 are suggesting makes no sense. But if you take the</p> <p>16 two highest bids and you give them both a subsidy,</p> <p>17 similar subsidy, so they both go up, then the order</p> <p>18 wouldn't change.</p> <p>19 So I'm not sure where you're going with</p> <p>20 this because the premise of it doesn't make any</p> <p>21 sense to me.</p> <p>22 Q. So if we return to your report,</p> <p>23 paragraph 172.</p> <p>24 A. Sorry, give me a second. 172. Okay.</p> <p>25 Q. Is it your opinion that publishers and</p>	<p>1 more accurate predictions than the sellers."</p> <p>2 Do you see that?</p> <p>3 A. Yes.</p> <p>4 Q. So that more accurate predictions by</p> <p>5 AdX, that is part of the reason that publishers and</p> <p>6 advertisers could not optimize their strategies?</p> <p>7 A. It's the way that these predictions are</p> <p>8 used that makes it difficult for publishers and</p> <p>9 sellers to optimize their strategies, along with</p> <p>10 the disclosures and the other things mentioned in</p> <p>11 the report.</p> <p>12 Q. If sellers could set floor prices</p> <p>13 optimally, DRS would not be possible; correct?</p> <p>14 MR. COLLIER: Objection. Form.</p> <p>15 A. Sorry, could you repeat the question</p> <p>16 again?</p> <p>17 Q. I'm looking at paragraph 176 of your</p> <p>18 report. "If sellers could set floor prices</p> <p>19 optimally, DRS would not be possible"; correct?</p> <p>20 A. Correct.</p> <p>21 Q. Another reason that publishers and</p> <p>22 advertisers could not optimize their strategies was</p> <p>23 because DRS increased variance in bids; is that</p> <p>24 correct?</p> <p>25 A. Correct.</p>

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<p style="text-align: right;">Page 218</p> <p>1 Q. And assuming that publishers knew 2 exactly how DRS functioned, they would have still 3 had difficulty in predicting where to place their 4 floor for AdX; correct? 5 A. Sorry -- I'm sorry. We've been going 6 for a long time. Try it again. 7 Q. I understand. 8 Assuming that publishers knew exactly 9 how DRS functioned, they still would have had 10 difficulty in predicting where to place their floor 11 for AdX; correct? 12 A. When you say knew how DRS functioned, do 13 you mean that DRS wouldn't be throttled? Like that 14 publishers would know exactly what the pool -- the 15 DRS pool information was and that they had all the 16 data that Google has? 17 I'm a little confused by your question. 18 Q. I can frame it again. 19 Assuming that publishers had full 20 disclosure from Google about how DRS functioned and 21 when it was in place, they still would have had 22 difficulty in predicting where to place their floors 23 for AdX; correct? 24 A. So again, it's not really clear what you 25 mean by "disclosure," because in order to place the</p>	<p style="text-align: right;">Page 220</p> <p>1 that would help them as well. And if you give them 2 more data, then that would help them also set the 3 floors. 4 Q. So let's set aside the data, because I'm 5 only talking about disclosures for this question. 6 So you say if -- if Google told 7 publishers how DRS is running, how it works, and if 8 you tell them, as you mentioned, when it's going to 9 be throttled on and off, if that information were 10 disclosed by Google to publishers, the publishers 11 still would have difficulty predicting where to 12 place their price floors for AdX; correct? 13 MR. COLLIER: Objection. Form. 14 A. I've already answered that question 15 twice now. 16 Q. Could you answer it again, please? 17 A. Sure. So if DRS was disclosed 18 appropriately, then publishers would be able to 19 optimize better. If the throttling information was 20 disclosed, exactly when the throttling would occur, 21 when the throttling is off and on, that would help 22 publishers as well. And if there were more data, 23 that would help publishers as well. 24 And it's difficult to optimize, you 25 know -- well, strike that. We're good.</p>
<p style="text-align: right;">Page 219</p> <p>1 floors optimally they would need to know -- they -- 2 it's matter of scale. If you have the disclosure, 3 then you can figure out, okay, what should I do 4 with this. Maybe I can optimize a little bit 5 better with this. If I had more data, then I could 6 optimize better with that. If I knew when DRS was 7 going to be throttled, then maybe I could use that 8 to do better on my optimization as well. 9 Q. So let me try to rephrase the question. 10 Assuming that Google disclosed all the 11 details about DRS, how it functioned, to which 12 transactions it applied, and any other relevant 13 details that you think are important to be 14 disclosed, publishers still would have had 15 difficulty in predicting where to set their floors 16 for AdX; correct? 17 MR. COLLIER: Objection. Form. 18 A. Okay. I will try to give that answer 19 more completely. 20 So every piece of information you give 21 publishers about the circumstance they're in helps 22 them set better floors. So if you tell them DRS is 23 running, this is how it works, that would help 24 them. If you tell them additional information, 25 like when it's going to be throttled on and off,</p>	<p style="text-align: right;">Page 221</p> <p>1 Q. If DRS was disclosed appropriately in 2 your view, would publishers be able to optimize 3 their prediction of where to set their floor prices 4 for AdX? 5 A. So as I mentioned, it's a matter of 6 degree. It's not a yes or no. It's if you 7 disclose what's going on, publishers can benefit 8 from that information. Like if you disclose DRS, 9 that would help publishers set the floors. If you 10 disclose the throttling and when the throttling 11 will occur, that will help publishers set the 12 floors. And if they had a lot more data like 13 Google has, that would also help them to set 14 floors. 15 Q. We will turn now to another feature 16 discussed in your report. 17 Starting in paragraph 163 of your report 18 you discuss something you refer to as Google's Last 19 Look program; is that correct? 20 A. That's not just something I refer to as 21 Google's Last Look program. Google refers to that 22 program as Last Look. It's in Google internal 23 slides. 24 Q. All I'm saying is you in your report 25 refer to it as Google's Last Look; right?</p>

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1 A. Me and Google refer to that program as
2 Last Look.
3 Q. You're familiar with the program that
4 you referred to as the Last Look program?
5 A. Yes.
6 Q. [REDACTED]
7 [REDACTED]
8 A. I need to go look up the dates. I agree
9 with those dates.
10 Q. [REDACTED]
11 [REDACTED]
12 correct?
13 A. Didn't you just say that?
14 Q. Are you asking --
15 A. Sorry, is this question different than
16 the last question? I must be getting tired. Maybe
17 we should take a break.
18 MR. COLLIER: I don't want to be
19 accused of coaching the witness. She agreed
20 with your statement and you made it sound like
21 a question again. Whatever --
22 Q. Let me ask the question again.
23 [REDACTED]
24 [REDACTED]
25 [REDACTED]?

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1 A. I believe that's the case.
2 Q. You state in your report, paragraph 170,
3 the second sentence of paragraph 170, "When Google
4 removed Last Look as part of the move to the
5 first-price auction in AdX."
6 Do you see that language?
7 A. Yes.
8 Q. And in paragraph 166 you state, in the
9 first sentence, "The illustration below shows that
10 without a 'Last Look' AdX bidders are forced to
11 predict competitors' bids. Professor Milgrom points
12 out that this is an extremely difficult prediction
13 problem. With the benefit of a 'Last Look,'
14 information about competitor bids and floor price
15 are known, so no prediction is needed."
16 Do you see that language?
17 A. Yes.
18 MR. HUNSBERGER: If we could turn
19 to Professor Milgrom's report from which you
20 cite this proposition. We can give you a copy
21 of that.
22 (Rudin Exhibit 9, Expert Report of
23 Professor Paul Milgrom dated July 30, 2024,
24 marked for identification, as of this date.)
25 BY MR. HUNSBERGER:

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1 Q. This is a copy of Professor Paul
2 Milgrom's report dated July 30, 2024, and it's been
3 stamped, for the record, as Exhibit 9 to the Rudin
4 deposition.
5 A. Thanks.
6 Q. I am going to ask you about paragraph 67
7 of his report.
8 A. Okay.
9 Q. Professor Milgrom is one of the experts
10 from Google that you respond to in this case; is
11 that correct?
12 A. Yes.
13 Q. And you cite to this paragraph 67 in
14 footnote 143 of your report; is that correct?
15 A. Yes.
16 Q. And you cite his statement about
17 two-thirds of the way down of that paragraph that
18 begins with the word "Guessing."
19 "Guessing the identities and bids of
20 others for each different impression is a costly and
21 error-prone activity that can lead to inefficiency
22 when bidders' guesses are wrong."
23 Do you see that language?
24 A. Yes.
25 Q. His next sentence reads, "In a

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1 first-price auction, the winner may be a bidder who
2 does not have the highest value for the impression."
3 Do you see that?
4 A. Yes.
5 Q. And on page 58 of Professor Milgrom's
6 report, right about paragraph 67, do you see the
7 heading for that section that says "First-Price
8 Auctions"?
9 A. Yes.
10 Q. So Professor Milgrom in this paragraph
11 was talking about first-price auctions when he wrote
12 the statement that you cited; correct?
13 MR. COLLIER: Object. Form.
14 A. I don't believe so. I think it was a
15 general statement.
16 Q. So your testimony is that in this
17 paragraph 67 that begins "In a first-price auction"
18 and only talks about first-price auctions in this
19 paragraph, that he's referring to second-price
20 auctions?
21 A. No. He's saying that in general
22 guessing the identities and bids of others for each
23 different impression is a costly and error-prone
24 activity that can lead to inefficiency when
25 bidders' guesses are wrong, and that's his general

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<p style="text-align: right;">Page 226</p> <p>1 information that he's using to talk about a</p> <p>2 particular disadvantage of first-price auctions.</p> <p>3 Q. As we just discussed, Last Look no</p> <p>4 longer existed once AdX moved to a first-price</p> <p>5 auction; correct?</p> <p>6 A. I'm sorry, we're going the whole day.</p> <p>7 I'm getting tired. Can you repeat the question</p> <p>8 again.</p> <p>9 Q. As we discussed a moment ago, Last Look</p> <p>10 no longer existed once AdX moved to a first-price</p> <p>11 auction; correct?</p> <p>12 A. I'm sorry, I believe there may have been</p> <p>13 a form of Last Look after that.</p> <p>14 Q. So if you look at paragraph 170 of your</p> <p>15 report, do you see the language --</p> <p>16 A. Oh --</p> <p>17 Q. -- "When Google removed Last Look as</p> <p>18 part of the move to the first-price auction in AdX"?</p> <p>19 A. I'm sorry, could you repeat the</p> <p>20 question? We've been going for a long time.</p> <p>21 Q. Google removed Last Look as part of the</p> <p>22 move to the first-price auction in AdX; correct?</p> <p>23 A. That's what it says here, yes.</p> <p>24 Q. And in the first-price auction, bidders</p> <p>25 have the incentive to submit a bid lower than their</p>	<p style="text-align: right;">Page 228</p> <p>1 strategy for buyers is to bid their true value;</p> <p>2 correct?</p> <p>3 MR. COLLIER: Objection. Form.</p> <p>4 A. In a second-price auction, bidders are</p> <p>5 incentivized to bid their true value if there's</p> <p>6 nothing else going on around the auction. Which is</p> <p>7 the pure single second-price auction.</p> <p>8 Q. And because of that, in a second-price</p> <p>9 auction bidders do not need to predict the bids of</p> <p>10 their competitors; is that correct?</p> <p>11 A. Again, if there's nothing else going on</p> <p>12 in the second-price auction -- because a lot of</p> <p>13 Google's auctions there's other things going on</p> <p>14 that are not disclosed. So in that case, it's</p> <p>15 really not clear how bidders exactly should bid and</p> <p>16 whether they should bid truthfully or not.</p> <p>17 Q. Regardless of whether Last Look applies</p> <p>18 in a second-price auction, because of the incentives</p> <p>19 buyers have in second-price auctions they don't have</p> <p>20 to predict the bids of other buyers; correct?</p> <p>21 MR. COLLIER: Objection. Form.</p> <p>22 A. Again, I'm not -- to be able to</p> <p>23 disentangle the second-price auction and Last Look</p> <p>24 I would need a bit more time than I have today,</p> <p>25 because then it's not a pure second-price auction</p>
<p style="text-align: right;">Page 227</p> <p>1 true value; is that correct?</p> <p>2 MR. COLLIER: Objection. Form.</p> <p>3 A. I'm not going to weigh in on auction</p> <p>4 theory, but that agrees with what we just read from</p> <p>5 Professor Milgrom's report.</p> <p>6 Q. Do you agree with Professor Milgrom on</p> <p>7 that point?</p> <p>8 A. Like I said, I'm not an expert on</p> <p>9 auction theory, so -- I mean, it seems reasonable.</p> <p>10 Q. Ideally bidders in a first-price auction</p> <p>11 would want to bid a penny above competitor bids;</p> <p>12 correct?</p> <p>13 A. Correct.</p> <p>14 Q. And that's why bidders need to predict</p> <p>15 competitor bids in a first-price auction; correct?</p> <p>16 A. Correct.</p> <p>17 THE WITNESS: Can we take a break</p> <p>18 pretty soon? Is that okay? Are we almost</p> <p>19 done with this?</p> <p>20 MR. HUNSBERGER: Yes, we can soon,</p> <p>21 if I can finish a couple more questions. Or</p> <p>22 we can take a break. By all means.</p> <p>23 THE WITNESS: Whatever you like.</p> <p>24 BY MR. HUNSBERGER:</p> <p>25 Q. In a second-price auction the optimal</p>	<p style="text-align: right;">Page 229</p> <p>1 because you're changing something about the auction</p> <p>2 that makes it different.</p> <p>3 MR. HUNSBERGER: Okay. We can take</p> <p>4 a break, Professor.</p> <p>5 THE VIDEOGRAPHER: Going on the</p> <p>6 record. The time is 6:36 p.m.</p> <p>7 (Recess taken.)</p> <p>8 THE VIDEOGRAPHER: Going back on</p> <p>9 the record. The time is 7:15 p.m.</p> <p>10 MR. COLLIER: Counsel, just a quick</p> <p>11 logistical issue. It's 7:15. She's not had</p> <p>12 dinner. I'm not sure, are you intending to</p> <p>13 use your whole 44 minutes? What is your</p> <p>14 intention? Because this is very difficult for</p> <p>15 her.</p> <p>16 MR. HUNSBERGER: We're happy to</p> <p>17 take a break for dinner if she would like, but</p> <p>18 we don't -- we may not have a full 44 minutes,</p> <p>19 but we may have 30 to 40 minutes. It's up to</p> <p>20 the witness.</p> <p>21 MR. COLLIER: I'm going to advise</p> <p>22 you that -- well -- she may need a break in</p> <p>23 the middle of the 44 to get something other</p> <p>24 than these cookies in her.</p> <p>25 MR. HUNSBERGER: Perfectly</p>

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<p style="text-align: right;">Page 230</p> <p>1 understandable.</p> <p>2 MR. COLLIER: I just don't want you</p> <p>3 to -- Cynthia, are you okay to push through</p> <p>4 the 44?</p> <p>5 THE WITNESS: I have no idea.</p> <p>6 Let's give it a try.</p> <p>7 MR. HUNSBERGER: Counsel, feel free</p> <p>8 to take a break. No objection to --</p> <p>9 MR. COLLIER: I didn't want you to</p> <p>10 think there was anything tactical about this.</p> <p>11 It is just it is 7:16 at night, and --</p> <p>12 MR. HUNSBERGER: It's been a long</p> <p>13 day. I understand. If you need a break, feel</p> <p>14 free. I will not object.</p> <p>15 THE WITNESS: Thank you.</p> <p>16 MR. COLLIER: You do what you need</p> <p>17 to do for your body.</p> <p>18 MR. HUNSBERGER: Agree with that.</p> <p>19 And I appreciate your patience on some very</p> <p>20 technical issues today.</p> <p>21 BY MR. HUNSBERGER:</p> <p>22 Q. If we take a step back from the specific</p> <p>23 optimizations we've been talking about and go back</p> <p>24 to your discussion of -- in your report of an</p> <p>25 abstracted auction, in your report you described an</p>	<p style="text-align: right;">Page 232</p> <p>1 A. I'm trying to compare your model to</p> <p>2 my model.</p> <p>3 So my model, it doesn't say what</p> <p>4 variables are available, and you specified which</p> <p>5 variables are available, so -- and you haven't</p> <p>6 specified who has what information. So I'm a</p> <p>7 little bit -- it's a little bit hard for me to do</p> <p>8 the comparison.</p> <p>9 Q. If we set aside your abstraction model</p> <p>10 and just compare the simple exchange that I</p> <p>11 described versus the real world and ad tech auctions</p> <p>12 today, would it be fair to say that it would be</p> <p>13 easier for buyers and sellers to estimate</p> <p>14 impressions in the simple exchange as opposed to the</p> <p>15 real world?</p> <p>16 A. Okay. So could you restate your simple</p> <p>17 exchange again?</p> <p>18 Q. You have an ad exchange known as "simple</p> <p>19 exchange." As the name implies, it has a very</p> <p>20 simple model. All it sends in its bid requests are</p> <p>21 three features: the domain of the website, the</p> <p>22 dimensions of the ad slot in pixels, and the time at</p> <p>23 which the auction will close.</p> <p>24 And the simple exchange runs a</p> <p>25 second-price auction.</p>
<p style="text-align: right;">Page 231</p> <p>1 abstracted auction and several variations on the</p> <p>2 auction; is that correct?</p> <p>3 A. That's correct.</p> <p>4 Q. I would like to walk through an exercise</p> <p>5 where we look at your abstracted auction and</p> <p>6 understand how your theories in your report apply to</p> <p>7 the abstracted auction.</p> <p>8 If we assume that we have an ad exchange</p> <p>9 known as "simple exchange." As the name implies, it</p> <p>10 has a very simple model. All it sends in its bid</p> <p>11 requests are three features: the domain of the</p> <p>12 website, the dimensions of the ad slot in pixels,</p> <p>13 and the time at which the auction will close.</p> <p>14 Let's further assume that the simple</p> <p>15 exchange runs a second-price auction.</p> <p>16 Under those circumstances, is it fair to</p> <p>17 assume that it is an easier model for buyers and</p> <p>18 sellers to estimate impression values than either</p> <p>19 your abstracted auction or the real world?</p> <p>20 A. Sorry. So you're asking whether what</p> <p>21 you just proposed was easier than my abstracted</p> <p>22 auction or the real world?</p> <p>23 Q. Easier for buyers and sellers to</p> <p>24 estimate impression values in the simple exchange</p> <p>25 model that I described.</p>	<p style="text-align: right;">Page 233</p> <p>1 A. Does the simple exchange do all of</p> <p>2 Google's manipulations as described?</p> <p>3 Q. It only does what I just described. It</p> <p>4 does not.</p> <p>5 A. Does it return -- what does -- does it</p> <p>6 withhold that data? Does it -- do the parties have</p> <p>7 access to that data? Does it adjust the bids?</p> <p>8 Does it -- all those things.</p> <p>9 Q. In all other respects it's the same as</p> <p>10 your abstracted model before any auction</p> <p>11 manipulation.</p> <p>12 A. Okay. So this is a -- sorry, I'm still</p> <p>13 trying to wrap my head around this, given that</p> <p>14 we've been going for so long.</p> <p>15 So you've got this abstract auction.</p> <p>16 There's three variables that are given to every</p> <p>17 bidder, and the -- it's the same as the abstract</p> <p>18 auction in every way?</p> <p>19 Q. In all other ways.</p> <p>20 A. All other ways. And you're asking</p> <p>21 whether it would be easier for sellers and bidders</p> <p>22 to construct their strategies; is that correct?</p> <p>23 Q. To estimate impression values.</p> <p>24 A. To estimate impression values. Okay.</p> <p>25 What is your definition of "easier"?</p>

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<p style="text-align: right;">Page 234</p> <p>1 Q. Under the methodology that you apply in</p> <p>2 this case and the basis on which you've provided</p> <p>3 your opinions.</p> <p>4 MR. COLLIER: Objection. Form.</p> <p>5 A. Okay. So, again, in the abstracted</p> <p>6 auction what do you mean -- do you mean, like, the</p> <p>7 valuations are more accurate, or do you mean that</p> <p>8 there's no better strategy?</p> <p>9 I just don't understand what you mean.</p> <p>10 Q. Easier to optimize, under your</p> <p>11 definition as you describe in your report.</p> <p>12 A. So, again, I still don't really</p> <p>13 understand what you mean by "easier," because, you</p> <p>14 know, it could mean several different things.</p> <p>15 Q. Is your opinion that when a bid request</p> <p>16 includes more information it is more difficult for</p> <p>17 buyers and sellers to model and estimate impression</p> <p>18 values?</p> <p>19 A. Okay. So you asked when a bid request</p> <p>20 includes more information, you're asking if it's</p> <p>21 more difficult to model and estimate impression</p> <p>22 values.</p> <p>23 And the answer is it depends on what</p> <p>24 kind of information that is, because if you reveal</p> <p>25 some information that is very telling, right,</p>	<p style="text-align: right;">Page 236</p> <p>1 hypothetical, so let me try to take it back to a</p> <p>2 concrete question related to Google's products.</p> <p>3 In your opinion, is there any change to</p> <p>4 Google's products that you could imagine that would</p> <p>5 increase variance in auction results and still be</p> <p>6 positive for advertisers and publishers?</p> <p>7 A. I think that requires a level of</p> <p>8 speculation that I'm not sure I am prepared to do</p> <p>9 at this moment.</p> <p>10 Q. But you don't offer an opinion that an</p> <p>11 increase in variance in auction results is</p> <p>12 necessarily a bad thing for advertisers or</p> <p>13 publishers; correct?</p> <p>14 MR. COLLIER: Objection. Form.</p> <p>15 A. So in the case of Google's conduct, the</p> <p>16 extra variance makes it harder to do the</p> <p>17 estimation.</p> <p>18 Q. And making it harder to do the</p> <p>19 estimation outweighs any other potential benefits to</p> <p>20 the publisher or advertiser from the product?</p> <p>21 A. I'm not weighing in on the relative</p> <p>22 merits of, you know, you hurt them one way and you</p> <p>23 benefit another way. That's not something I can</p> <p>24 do.</p> <p>25 Q. Your opinion is limited to the impact on</p>
<p style="text-align: right;">Page 235</p> <p>1 that -- when you provide more information, then it</p> <p>2 might make it easier to estimate. But if you</p> <p>3 include a huge amount of information, none of which</p> <p>4 is particularly relevant, then it might make it</p> <p>5 harder to estimate.</p> <p>6 Q. Under the simple exchange and the</p> <p>7 assumptions I've described, could you explain what</p> <p>8 would make it easier for buyers and sellers to</p> <p>9 estimate impression values and what would make it</p> <p>10 harder for buyers and sellers to estimate impression</p> <p>11 values?</p> <p>12 MR. COLLIER: Object. Form.</p> <p>13 A. Okay. If you -- if the buyers and</p> <p>14 sellers receive information that is closer -- let's</p> <p>15 say it's highly correlated with the valuation.</p> <p>16 Then that would make it easier to do that kind of</p> <p>17 estimation.</p> <p>18 And if the buyers and sellers receive a</p> <p>19 lot of information that is not correlated with the</p> <p>20 valuation, then that would make it difficult for</p> <p>21 them to do the estimation. Or a small amount of</p> <p>22 information that is not relevant. Any nonrelevant</p> <p>23 information or less relevant information could make</p> <p>24 it more difficult.</p> <p>25 Q. I think we're having difficulty with the</p>	<p style="text-align: right;">Page 237</p> <p>1 advertisers and publishers from the perspective of</p> <p>2 their use of machine-learning models to optimize</p> <p>3 their outcomes; is that correct?</p> <p>4 A. What do you mean by "limited"?</p> <p>5 Q. So you mentioned that: I'm not weighing</p> <p>6 in on the relative merits of some harms and some</p> <p>7 benefits.</p> <p>8 I'm just trying to understand what you</p> <p>9 are weighing in on specifically.</p> <p>10 MR. COLLIER: Objection. Form.</p> <p>11 MR. HUNSBERGER: I was clarifying</p> <p>12 in response to the witness's question, so I</p> <p>13 can repeat.</p> <p>14 MR. COLLIER: It wasn't a</p> <p>15 criticism. I just don't think it was a</p> <p>16 question standing alone.</p> <p>17 MR. HUNSBERGER: Understood. The</p> <p>18 witness is asking me a lot of questions, so</p> <p>19 I'm trying to give her the information she</p> <p>20 needs.</p> <p>21 MR. COLLIER: I understand. It</p> <p>22 wasn't a criticism.</p> <p>23 I think he's going to ask a</p> <p>24 question.</p> <p>25 BY MR. HUNSBERGER:</p>

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<p style="text-align: right;">Page 238</p> <p>1 Q. Do you offer any opinions in this case</p> <p>2 that weigh the impact of Google's conduct on</p> <p>3 advertisers and publishers from the perspective of</p> <p>4 machine-learning models to optimize outcomes versus</p> <p>5 any other considerations?</p> <p>6 MR. COLLIER: Objection. Form.</p> <p>7 A. It's very difficult for me to weigh</p> <p>8 conduct.</p> <p>9 I'm sorry, that question was worded</p> <p>10 unclearly.</p> <p>11 Q. Do you offer any opinions in this case</p> <p>12 that weigh the concerns you have identified from a</p> <p>13 machine-learning perspective?</p> <p>14 MR. COLLIER: Objection. Form.</p> <p>15 MR. HUNSBERGER: I wasn't done with</p> <p>16 my question, Counselor.</p> <p>17 MR. COLLIER: Apologies. I thought</p> <p>18 you were done.</p> <p>19 A. Weigh the concerns -- I just don't</p> <p>20 understand --</p> <p>21 MR. COLLIER: I don't understand.</p> <p>22 If you weren't done with your question, are</p> <p>23 you going to finish your question?</p> <p>24 MR. HUNSBERGER: You've been</p> <p>25 talking and she's been talking, so I will wait</p>	<p style="text-align: right;">Page 240</p> <p>1 final questions, but if you would like to take</p> <p>2 a break, we are happy to take a break. I know</p> <p>3 it has been a long day.</p> <p>4 THE WITNESS: No, I'm good.</p> <p>5 MR. COLLIER: Doctor, it's up to</p> <p>6 you.</p> <p>7 I suspect her answer depends on how</p> <p>8 many more minutes he has. But is this three</p> <p>9 minutes of questions or --</p> <p>10 MR. HUNSBERGER: Probably more than</p> <p>11 three minutes. Depends on how the questioning</p> <p>12 and the answers go.</p> <p>13 THE WITNESS: We can keep going.</p> <p>14 That's fine.</p> <p>15 BY MR. HUNSBERGER:</p> <p>16 Q. It's been a long day. We've talked</p> <p>17 about a number of issues today. I wanted to take a</p> <p>18 few minutes and confirm that I understand the scope</p> <p>19 of your opinions.</p> <p>20 In your report you offer opinions on the</p> <p>21 effects of Google optimizations on publishers' and</p> <p>22 advertisers' ability to optimize machine learning;</p> <p>23 is that correct?</p> <p>24 A. Yes.</p> <p>25 Q. In your report you do not offer any</p>
<p style="text-align: right;">Page 239</p> <p>1 until you're done talking and then I will ask</p> <p>2 my question.</p> <p>3 MR. COLLIER: My talking is</p> <p>4 objecting. I'm done objecting. You may now</p> <p>5 ask your question, sir.</p> <p>6 BY MR. HUNSBERGER:</p> <p>7 Q. Do you offer any opinions in this case</p> <p>8 that weigh the concerns you have identified from a</p> <p>9 machine-learning perspective against any potential</p> <p>10 benefits that may result from the products that you</p> <p>11 have analyzed?</p> <p>12 MR. COLLIER: I speak again.</p> <p>13 Object. Form.</p> <p>14 You may answer.</p> <p>15 A. Maybe it's late in the day, but I'm just</p> <p>16 not sure what this question means, in terms of what</p> <p>17 does it mean to weigh one concern against a</p> <p>18 potential benefit?</p> <p>19 I mean, I analyzed the conducts in depth</p> <p>20 in this report, and I've talked about all the</p> <p>21 problems, you know, many problems with the</p> <p>22 conducts. It wasn't my job to, you know, do things</p> <p>23 that are outside the realm of this report, so I'm</p> <p>24 really not sure what you are asking.</p> <p>25 MR. HUNSBERGER: Okay. I have some</p>	<p style="text-align: right;">Page 241</p> <p>1 opinions on how Google's optimizations may have</p> <p>2 affected rival ad tech companies; is that correct?</p> <p>3 A. That's not true.</p> <p>4 Q. Which opinions do you offer on how</p> <p>5 Google's optimization may have affected rival</p> <p>6 ad tech companies?</p> <p>7 A. There are many opinions on that topic</p> <p>8 throughout the report. I could refer you to some</p> <p>9 of the statistics toward the end of the report if</p> <p>10 you would like.</p> <p>11 Q. So when I refer to "rival ad tech</p> <p>12 companies" I'm talking about Google's competitors in</p> <p>13 the provision of ad tech tools. I'm not talking</p> <p>14 about publishers or advertisers. So I want to make</p> <p>15 sure we're on the same page when it comes to</p> <p>16 terminology.</p> <p>17 I can ask the question again for</p> <p>18 clarity, if that would be helpful.</p> <p>19 A. I'm sorry, but I feel like I've already</p> <p>20 answered your question because, you know, you asked</p> <p>21 me if I make any opinions about competitors, and I</p> <p>22 do, and they're in this report.</p> <p>23 Q. What are your opinions on the impact of</p> <p>24 Google's optimizations on rival ad tech companies?</p> <p>25 A. So, again, they're in this report,</p>

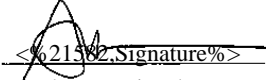
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<p style="text-align: right;">Page 242</p> <p>1 throughout the report, but I will focus towards the</p> <p>2 end of the report if you want to see more details.</p> <p>3 Near the end of the report somewhere.</p> <p>4 Q. Which -- I guess at a high level, what</p> <p>5 are your opinions in that section of your report?</p> <p>6 A. Well, I don't feel comfortable</p> <p>7 summarizing, but I'm happy to read parts if you</p> <p>8 like. Would you like me to find them?</p> <p>9 Q. I don't think it's a good use of time to</p> <p>10 read -- just read sections of your report, but if</p> <p>11 you have at a high level what your summary of</p> <p>12 opinions is with respect to competitors?</p> <p>13 A. Okay. Let me see if I can find it</p> <p>14 quickly. It's literally throughout the report. It</p> <p>15 talks about -- it's literally throughout the</p> <p>16 report. There's some useful statistics at the end</p> <p>17 that pertain to this. Yeah.</p> <p>18 Q. Can you direct me to a paragraph number?</p> <p>19 A. Sure. Just give me a second.</p> <p>20 Okay. So it should be in the section</p> <p>21 starting on page 82.</p> <p>22 Q. Looking at page 82, paragraph 241, is</p> <p>23 that what you're referring to?</p> <p>24 A. That's the start of the section I refer</p> <p>25 to. Again, there could be throughout the report</p>	<p style="text-align: right;">Page 244</p> <p>1 whether advertisers and publishers were able to</p> <p>2 arrive at optimal strategies before the introduction</p> <p>3 of Google's auction manipulations?</p> <p>4 MR. COLLIER: Objection. Form.</p> <p>5 A. So again, it's really a matter of the</p> <p>6 fact that Google's manipulations made it much more</p> <p>7 difficult to optimize strategies. So by</p> <p>8 withholding data, by all of the different conducts,</p> <p>9 by not disclosing. All of these things make it</p> <p>10 more difficult to optimize.</p> <p>11 Q. And did you analyze whether advertisers</p> <p>12 and publishers were able to optimize before Google</p> <p>13 started the alleged conduct that you analyze in your</p> <p>14 report?</p> <p>15 MR. COLLIER: Objection. Form.</p> <p>16 A. So, again, it's really not a matter of</p> <p>17 the fact that Google's manipulations made it much</p> <p>18 more difficult to optimize strategies. By</p> <p>19 withholding data, by all of the different conducts,</p> <p>20 by not disclosing all of these conducts, that makes</p> <p>21 it more difficult to optimize.</p> <p>22 Q. But you did not analyze a world prior to</p> <p>23 Google's auction manipulations; correct?</p> <p>24 MR. COLLIER: Objection. Form.</p> <p>25 A. So, again, it's really not a matter</p>
<p style="text-align: right;">Page 243</p> <p>1 sections to competitors.</p> <p>2 Q. So taking a step back, as you've</p> <p>3 described, your opinion is that due to Google's</p> <p>4 auction manipulations sellers and buyers would not</p> <p>5 be able to experiment to arrive at optimal</p> <p>6 strategies; is that correct?</p> <p>7 A. Yes. Sellers and buyers have a very</p> <p>8 hard time experimenting. They would struggle to</p> <p>9 arrive at optimal strategies due to Google's</p> <p>10 auction manipulations.</p> <p>11 Q. And the term "optimal strategies" is</p> <p>12 context dependent; is that correct?</p> <p>13 A. Yes.</p> <p>14 Q. And different advertisers and different</p> <p>15 publishers might have different definitions of that</p> <p>16 term?</p> <p>17 A. Correct.</p> <p>18 Q. And in your report you do not provide a</p> <p>19 single definition of the term "optimal strategies";</p> <p>20 is that correct?</p> <p>21 A. Importantly, yes. It's really important</p> <p>22 that publishers can optimize to their own</p> <p>23 objectives and advertisers can optimize their own</p> <p>24 objectives.</p> <p>25 Q. In your report you do not analyze</p>	<p style="text-align: right;">Page 245</p> <p>1 of -- it's really -- sorry.</p> <p>2 The fact is that Google's manipulations</p> <p>3 made it much more difficult to optimize strategies,</p> <p>4 by withholding data, by all of the different</p> <p>5 conducts, by not disclosing the conducts, and it</p> <p>6 makes it more difficult to optimize.</p> <p>7 Q. I apologize. I don't think that's an</p> <p>8 answer to my question, so I will try asking in a</p> <p>9 different way.</p> <p>10 Did you analyze a -- the ad tech</p> <p>11 industry and whether publishers and advertisers</p> <p>12 could optimize before Google started what you</p> <p>13 referred to as the "auction manipulations"?</p> <p>14 A. So as I mentioned, Google's conducts</p> <p>15 made it much more difficult to optimize strategies</p> <p>16 because they withheld data. That makes it more</p> <p>17 difficult to do machine learning, estimation and</p> <p>18 prediction. These conducts increased variance.</p> <p>19 And the throttling that disguises the conducts.</p> <p>20 All of these things make it more difficult to</p> <p>21 optimize.</p> <p>22 Q. When you say "more difficult to</p> <p>23 optimize," what is the baseline against which you're</p> <p>24 comparing?</p> <p>25 MR. COLLIER: Objection. Form.</p>

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<p style="text-align: right;">Page 246</p> <p>1 You can answer.</p> <p>2 A. Okay. So for example, without a certain</p> <p>3 conduct it would be easier to do X, for instance.</p> <p>4 Q. Do you analyze a world without that</p> <p>5 certain conduct in place?</p> <p>6 MR. COLLIER: Objection. Form.</p> <p>7 A. So as I mentioned, Google's conducts</p> <p>8 make it much more difficult to optimize than if</p> <p>9 those conducts were not present because they</p> <p>10 withheld data, which makes it difficult to do</p> <p>11 machine learning. The conducts increase variance,</p> <p>12 which makes it more difficult to do prediction.</p> <p>13 Throttling makes it difficult to detect the</p> <p>14 conducts and optimize on top of them. All of these</p> <p>15 things make it more difficult to perform</p> <p>16 optimization.</p> <p>17 Q. You referred in your answer several</p> <p>18 times to "more difficult."</p> <p>19 Do you analyze more difficult relative</p> <p>20 to what?</p> <p>21 MR. COLLIER: Objection. Form.</p> <p>22 A. Okay. You've already asked me that</p> <p>23 question like four or five times now.</p> <p>24 Q. You haven't answered the question, and</p> <p>25 it's a very straightforward question, and if you</p>	<p style="text-align: right;">Page 248</p> <p>1 over the internet. It's all over all the citations</p> <p>2 that I give. It is all over the Google internal</p> <p>3 documents. So there's no need for me to interview</p> <p>4 anyone to find that out.</p> <p>5 Q. In forming your opinions in this case</p> <p>6 did you investigate the types of data that</p> <p>7 advertisers and publishers use to generate estimates</p> <p>8 of bids and floor prices?</p> <p>9 MR. COLLIER: Objection. Form.</p> <p>10 A. Yes. And there's a section on that in</p> <p>11 my report.</p> <p>12 Q. In your opinion is part of the problem</p> <p>13 you describe in your report that publishers and</p> <p>14 advertisers do not have enough information?</p> <p>15 A. They have much less information than</p> <p>16 Google does. They cannot compete with Google.</p> <p>17 Q. Ultimately is it your opinion that if</p> <p>18 Google has data that it uses to construct</p> <p>19 machine-learning models it should share that data</p> <p>20 with publishers and advertisers?</p> <p>21 MR. COLLIER: Objection. Form.</p> <p>22 A. I make no opinion on that. The question</p> <p>23 is how they use that data or how they don't use</p> <p>24 that data.</p> <p>25 Q. You have no opinion on whether Google</p>
<p style="text-align: right;">Page 247</p> <p>1 answered it we could easily move on.</p> <p>2 A. I thought I answered it sufficiently</p> <p>3 well the first time, as well as the second, third</p> <p>4 and fourth time. I can keep answering if you would</p> <p>5 like.</p> <p>6 MR. COLLIER: Dr. Rudin, just try</p> <p>7 again. Answer his question again as best you</p> <p>8 can.</p> <p>9 A. If the conducts were not present -- with</p> <p>10 and without the conducts, it's much more difficult</p> <p>11 to do the optimization with the conducts, with --</p> <p>12 when Google withholds data, when they have their</p> <p>13 conducts, when they throttle their conducts, all of</p> <p>14 these manipulations make it much more difficult to</p> <p>15 analyze than if those conducts were not there.</p> <p>16 Q. As part of your opinions in this case</p> <p>17 you have formed a view that advertisers and</p> <p>18 publishers use machine learning to help estimate</p> <p>19 bids and floor prices; is that correct?</p> <p>20 A. Yes.</p> <p>21 Q. Did you interview any advertisers or</p> <p>22 publishers to confirm that view?</p> <p>23 MR. COLLIER: Objection. Form.</p> <p>24 You can answer.</p> <p>25 A. That answer is everywhere. It is all</p>	<p style="text-align: right;">Page 249</p> <p>1 should share its data with publishers and</p> <p>2 advertisers?</p> <p>3 MR. COLLIER: Objection. Form.</p> <p>4 A. The question of what Google should do is</p> <p>5 beyond the scope of my report. I'm not allowed to</p> <p>6 say what -- who should be doing what.</p> <p>7 I have opinions on how Google uses the</p> <p>8 data that it collects, but I don't have any opinion</p> <p>9 on who should be doing what. That requires a</p> <p>10 policy, and it's beyond the scope of my report.</p> <p>11 Q. In providing your opinions did you study</p> <p>12 how any non-Google ad tech tools operate?</p> <p>13 A. Which tools are you referring to</p> <p>14 specifically?</p> <p>15 Q. Ad exchanges offered by non-Google</p> <p>16 companies or buy-side tools offered by non-Google</p> <p>17 companies.</p> <p>18 A. I cite several public papers in my</p> <p>19 report that describe how these tools generally</p> <p>20 operate.</p> <p>21 Do I have propriety information from any</p> <p>22 of these tools? No.</p> <p>23 Q. Do you offer any opinion in this case on</p> <p>24 whether compared to Google those non-Google ad tech</p> <p>25 tools share more, less or the same amount of data</p>

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<p style="text-align: right;">Page 250</p> <p>1 with publishers and advertisers?</p> <p>2 A. In the sense that that would require</p> <p>3 proprietary information, there's no way I can know</p> <p>4 that information.</p> <p>5 Q. In your report you're not offering</p> <p>6 any opinion on the commercial effects of sharing</p> <p>7 data with third-parties outside of Google; correct?</p> <p>8 A. I don't know what a "commercial effect"</p> <p>9 means.</p> <p>10 Q. Do you offer any opinions on the privacy</p> <p>11 implications of sharing that data?</p> <p>12 A. I'm not a privacy expert.</p> <p>13 Q. Do you offer any opinions on the</p> <p>14 legality of sharing that data under U.S. or other</p> <p>15 laws?</p> <p>16 A. I'm not a legal expert.</p> <p>17 Q. Prior to being retained as an expert</p> <p>18 witness in this matter, did you have an opinion on</p> <p>19 Google as a company?</p> <p>20 MR. COLLIER: Objection. Form.</p> <p>21 A. Google's not a monolith, so I give many</p> <p>22 opinions about Google, and none of them are</p> <p>23 relevant here.</p> <p>24 Q. Prior to being retained as an expert</p> <p>25 witness in this matter what opinions did you hold</p>	<p style="text-align: right;">Page 252</p> <p>1 as highly confidential under the protective</p> <p>2 order.</p> <p>3 MR. COLLIER: Dr. Rudin, the States</p> <p>4 will reserve their questions until the time of</p> <p>5 trial, which means you're excused.</p> <p>6 THE VIDEOGRAPHER: This ends the</p> <p>7 deposition. The time is 7:53 p.m.</p> <p>8 (Deposition concluded at 7:53 p.m.)</p> <p>9 (Signature reserved)</p>
<p style="text-align: right;">Page 251</p> <p>1 about Google?</p> <p>2 MR. COLLIER: Objection. Form.</p> <p>3 Counsel, are you asking about her</p> <p>4 personal opinions?</p> <p>5 MR. HUNSBERGER: I'm asking</p> <p>6 questions that go to bias.</p> <p>7 MR. COLLIER: You can answer. Go</p> <p>8 ahead.</p> <p>9 A. I think Google does some things really</p> <p>10 well and Google does some things not so well. It's</p> <p>11 not a monolith. Their research division is very</p> <p>12 good. I wasn't familiar with the ad tech side of</p> <p>13 Google before this case.</p> <p>14 MR. HUNSBERGER: Professor Rudin,</p> <p>15 thank you for your time and patience today.</p> <p>16 It's been a long day, and I appreciate you</p> <p>17 bearing with us through some very difficult</p> <p>18 technical subject matter.</p> <p>19 Your counsel may decide to ask you</p> <p>20 some questions. I reserve the remainder of my</p> <p>21 time to ask any follow-up questions based on</p> <p>22 that. But subject to that I have no further</p> <p>23 questions at this time.</p> <p>24 And I want to note for the record</p> <p>25 that Google would like to mark the transcript</p>	<p style="text-align: right;">Page 253</p> <p>1 STATE OF NORTH CAROLINA</p> <p>2 WAKE COUNTY</p> <p>3 REPORTER'S CERTIFICATE</p> <p>4 I, Andrea L. Kingsley, a Notary Public</p> <p>5 in and for the State of North Carolina, do hereby</p> <p>6 certify that there came before me on Wednesday,</p> <p>7 October 9, 2024, the person hereinbefore named, who</p> <p>8 was by me duly sworn via Virtual Zoom to testify to</p> <p>9 the truth and nothing but the truth of his</p> <p>10 knowledge concerning the matters in controversy in</p> <p>11 this cause; that the witness was thereupon examined</p> <p>12 under oath, the examination reduced to typewriting</p> <p>13 under my direction, and the deposition is a true</p> <p>14 record of the testimony given by the witness.</p> <p>15 I further certify that I am neither</p> <p>16 attorney or counsel for, nor related to or employed</p> <p>17 by, any attorney or counsel employed by the parties</p> <p>18 hereto or financially interested in the action.</p> <p>19 IN WITNESS WHEREOF, I have hereto set</p> <p>20 my hand this 9th day of October, 2024.</p> <p>21 </p> <p>22 21582.Signature%></p> <p>23 Andrea L. Kingsley, Notary Public</p> <p>24 Notary Public #201903800023</p> <p>25</p>

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<p style="text-align: right;">Page 254</p> <p>1 Marc B. Collier, Esquire 2 marc.collier@nortonrosefulbright.com 3 October 10, 2024 4 RE: The State Of Texas, Et Al. v. Google LLC 5 10/9/2024, Cynthia Rudin (#6918999) 6 The above-referenced transcript is available for 7 review. 8 Within the applicable timeframe, the witness should 9 read the testimony to verify its accuracy. If there are 10 any changes, the witness should note those with the 11 reason, on the attached Errata Sheet. 12 The witness should sign the Acknowledgment of 13 Deponent and Errata and return to the deposing attorney. 14 Copies should be sent to all counsel, and to Veritext at 15 erratas-cs@veritext.com. 16 Return completed errata within 30 days from 17 receipt of testimony. 18 If the witness fails to do so within the time 19 allotted, the transcript may be used as if signed. 20 21 22 Yours, 23 Veritext Legal Solutions 24 25</p>	<p style="text-align: right;">Page 256</p> <p>1 The State Of Texas, Et Al. v. Google LLC 2 Cynthia Rudin (#6918999) 3 ACKNOWLEDGEMENT OF DEPONENT 4 I, Cynthia Rudin, do hereby declare that I 5 have read the foregoing transcript, I have made any 6 corrections, additions, or changes I deemed necessary as 7 noted above to be appended hereto, and that the same is 8 a true, correct and complete transcript of the testimony 9 given by me. 10 11 _____ 12 Cynthia Rudin Date 13 *If notary is required 14 SUBSCRIBED AND SWORN TO BEFORE ME THIS 15 _____ DAY OF _____, 20____. 16 17 18 _____ 19 NOTARY PUBLIC 20 21 22 23 24 25</p>
<p style="text-align: right;">Page 255</p> <p>1 The State Of Texas, Et Al. v. Google LLC 2 Cynthia Rudin (#6918999) 3 E R R A T A S H E E T 4 PAGE____ LINE____ CHANGE_____ 5 _____ 6 REASON_____ 7 PAGE____ LINE____ CHANGE_____ 8 _____ 9 REASON_____ 10 PAGE____ LINE____ CHANGE_____ 11 _____ 12 REASON_____ 13 PAGE____ LINE____ CHANGE_____ 14 _____ 15 REASON_____ 16 PAGE____ LINE____ CHANGE_____ 17 _____ 18 REASON_____ 19 PAGE____ LINE____ CHANGE_____ 20 _____ 21 REASON_____ 22 _____ 23 _____ 24 Cynthia Rudin Date 25</p>	